THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXI. No. 1569.] LONDON, JUNE 6, 1893. [45TH YEAR. PRICE 6d.

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See Advt. p. III., centre of JOURNAL.

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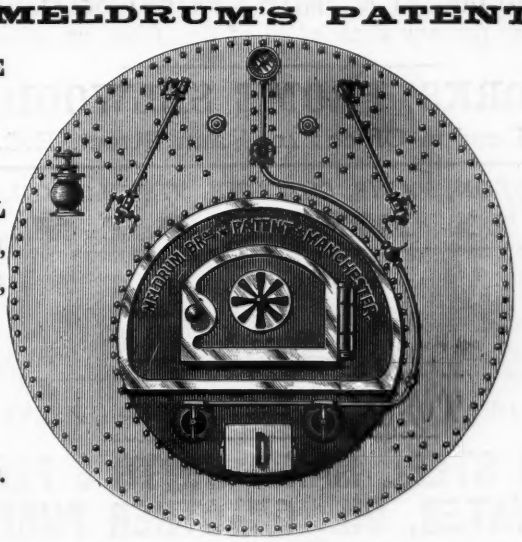

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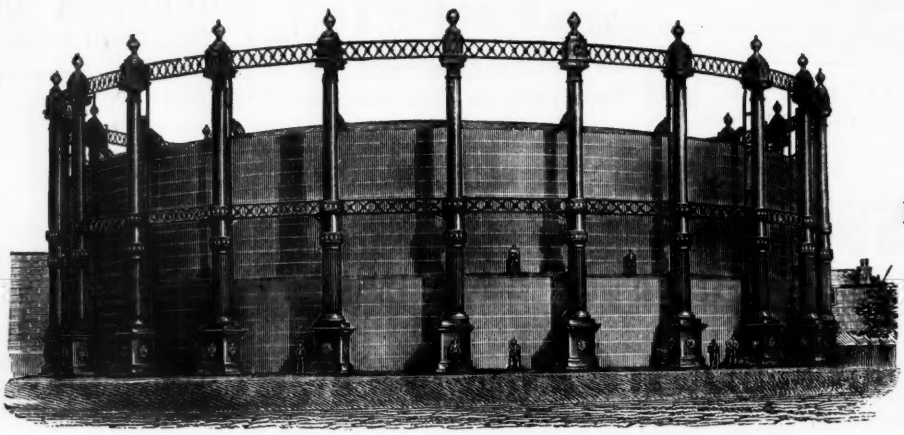

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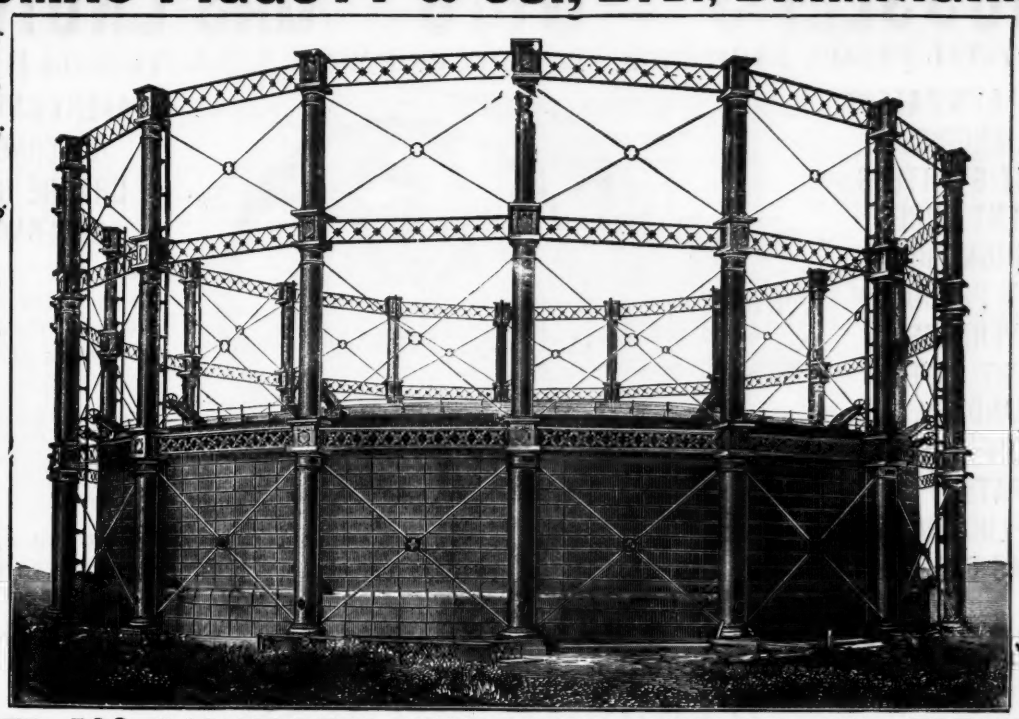

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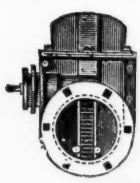

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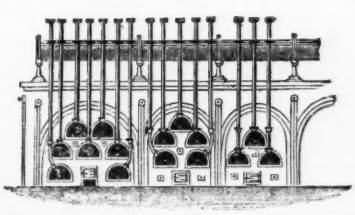

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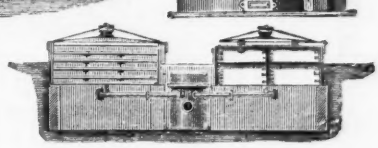

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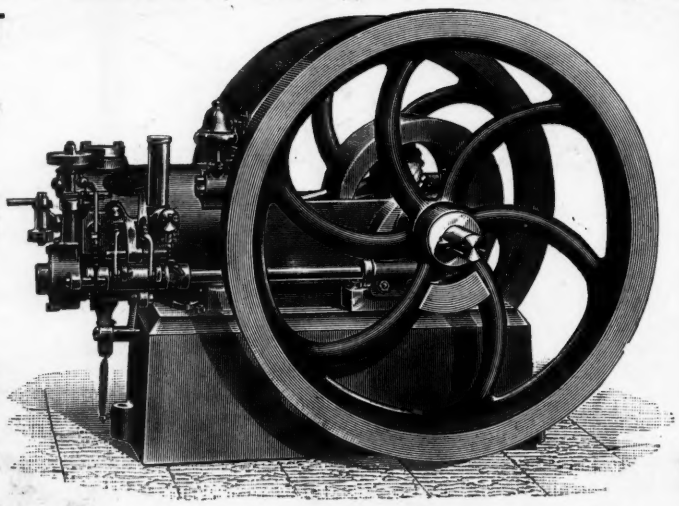

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Every Engine thoroughly tested before being sent out

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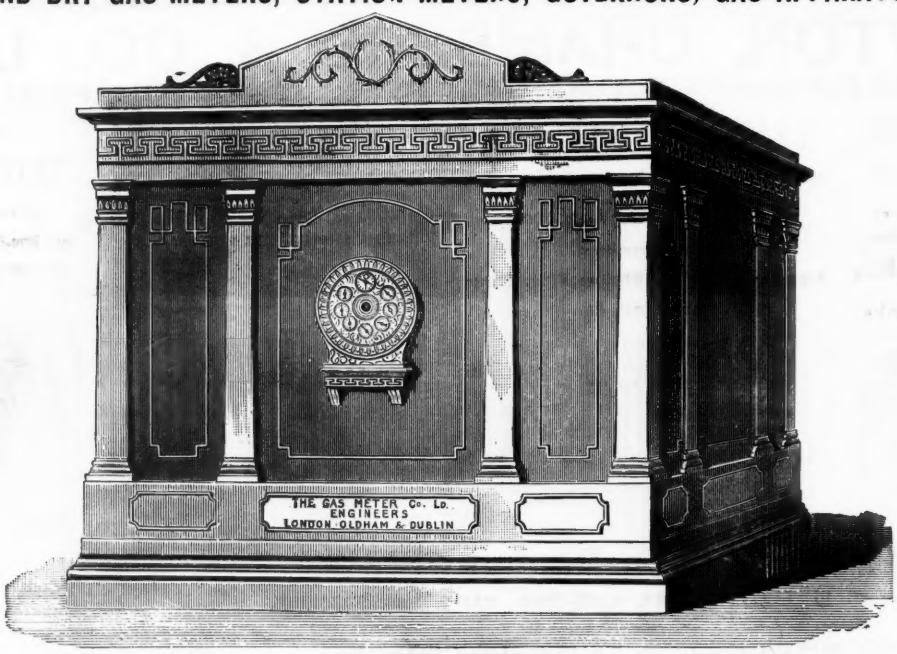

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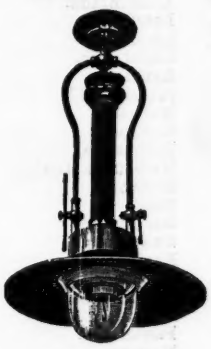

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The Electric Light's greatest Rival. Has been awarded 8 Gold and Silver Medals.

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Dundalk.
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Elsecar.
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Filey.
Formby.
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Grimsby.
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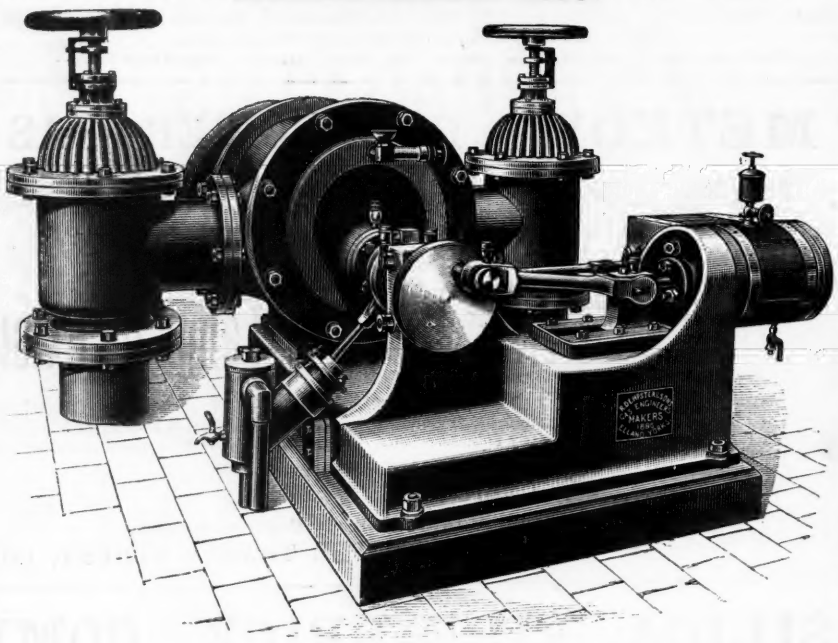

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For Articles on and descriptive of the above Apparatus, see *Journal of Gas Lighting* for Dec. 13, 1892; March 7, April 25, May 2, and May 16, 1893. Also, the *Gas World*, Jan. 21 and May 6, 1893.

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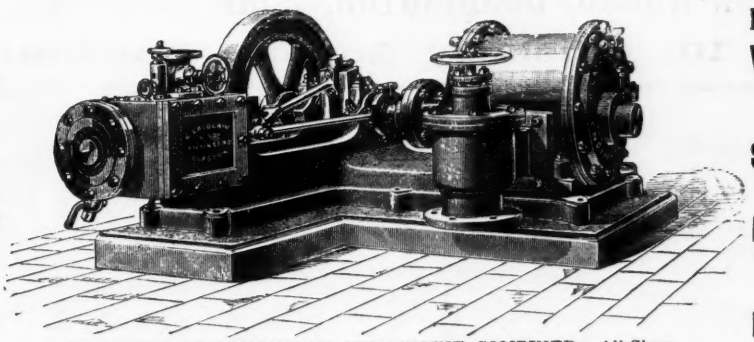

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EXPERIMENTAL HOURLY-RATE METERS, TEST METERS,
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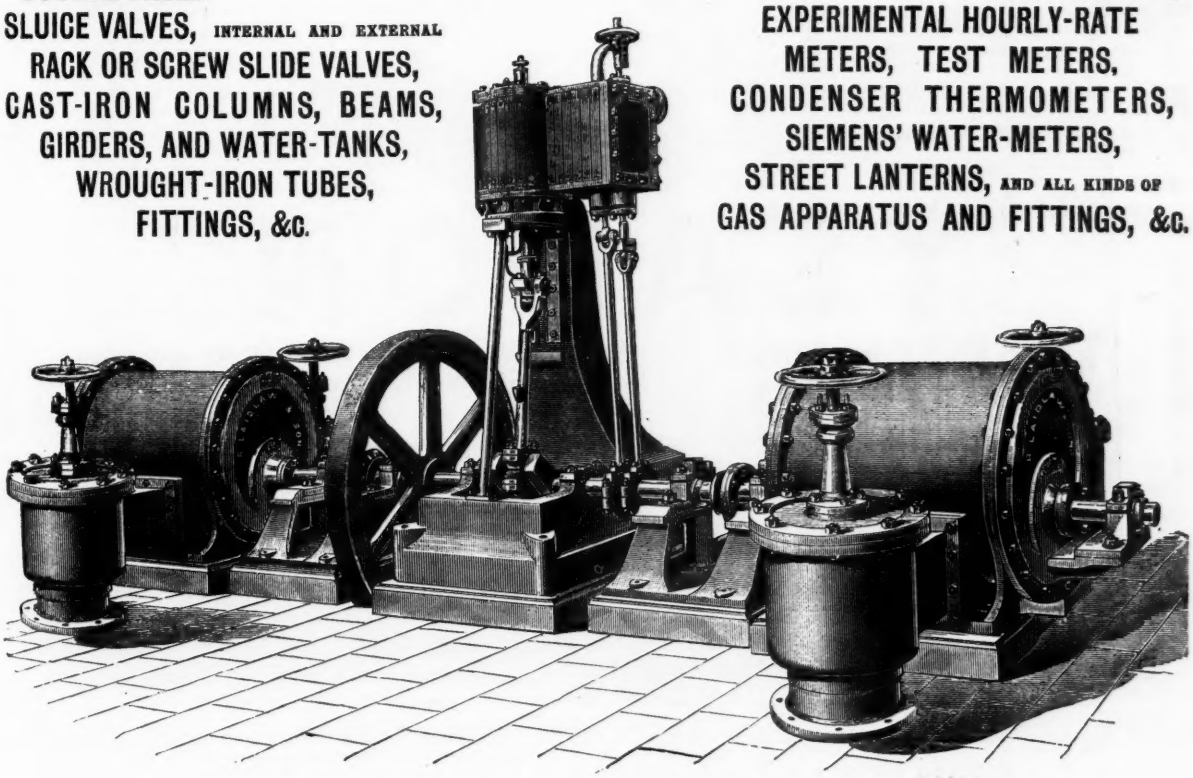
GAS APPARATUS AND FITTINGS, &c.



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Prices, with full Particulars, will be given on application.

Two Gold Medals, One Silver Medal, One Bronze Medal, and Two Honourable Mentions,
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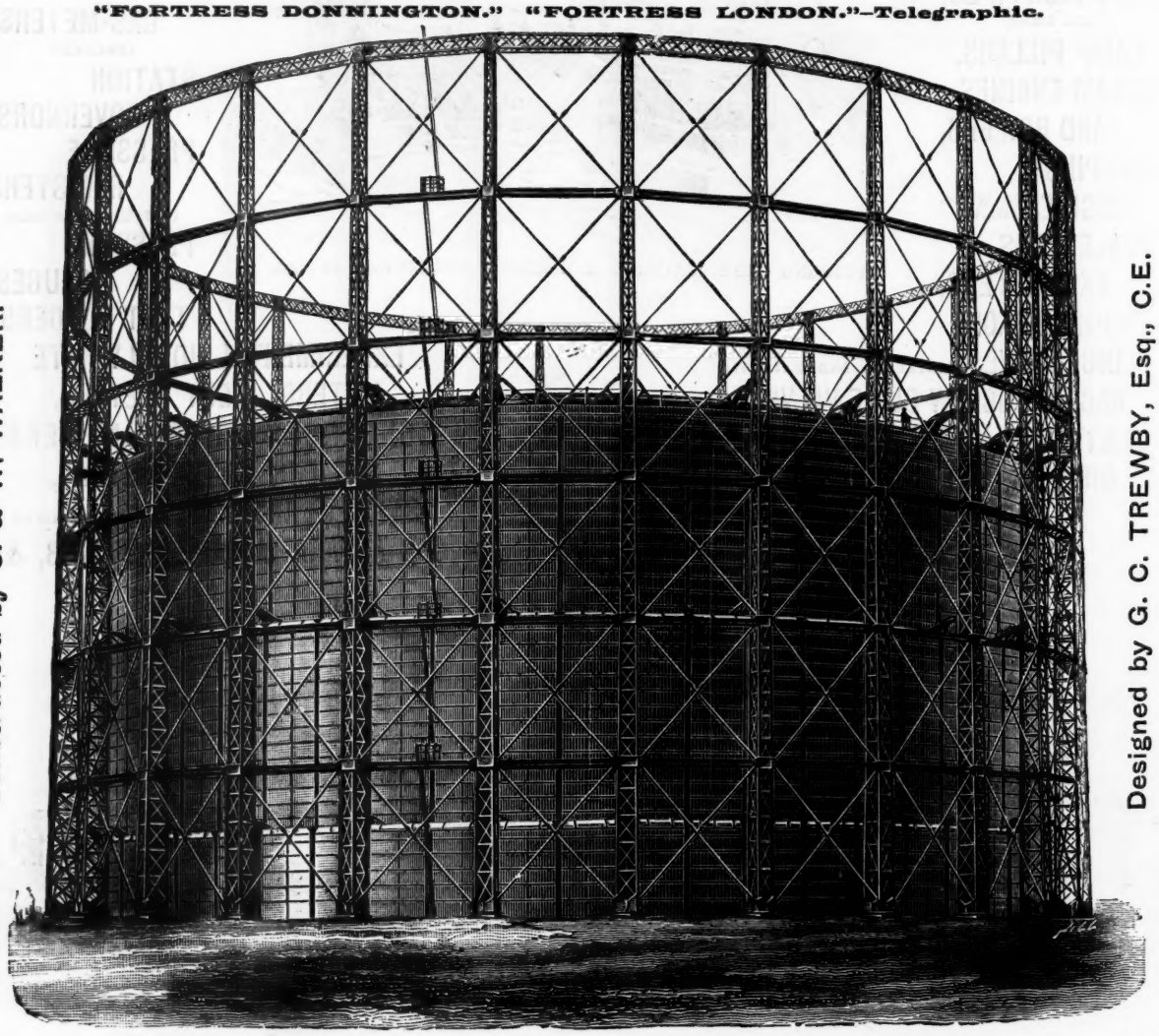

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LIMITED.

(SIDNEY HERSEY, Managing Director.) (J. CHANDLER, Engineer.)

Patentees of the

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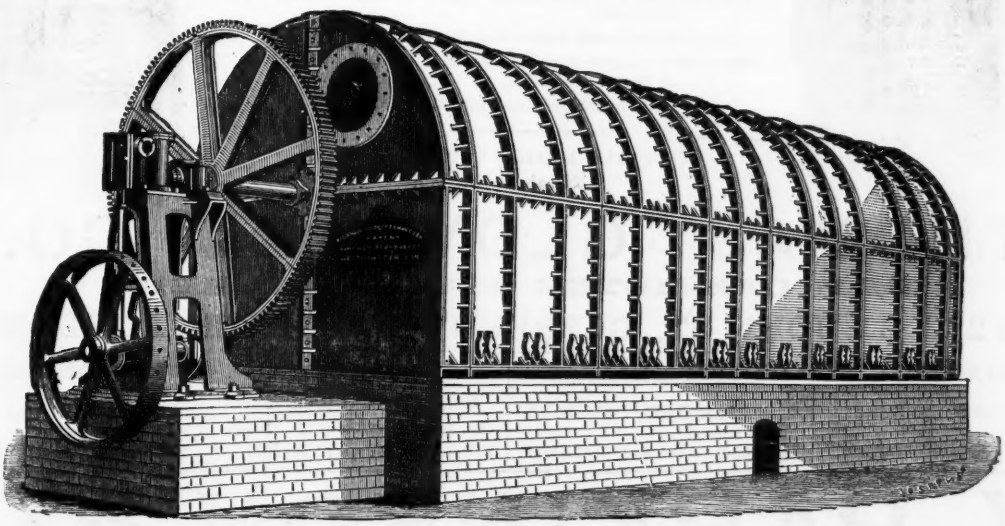
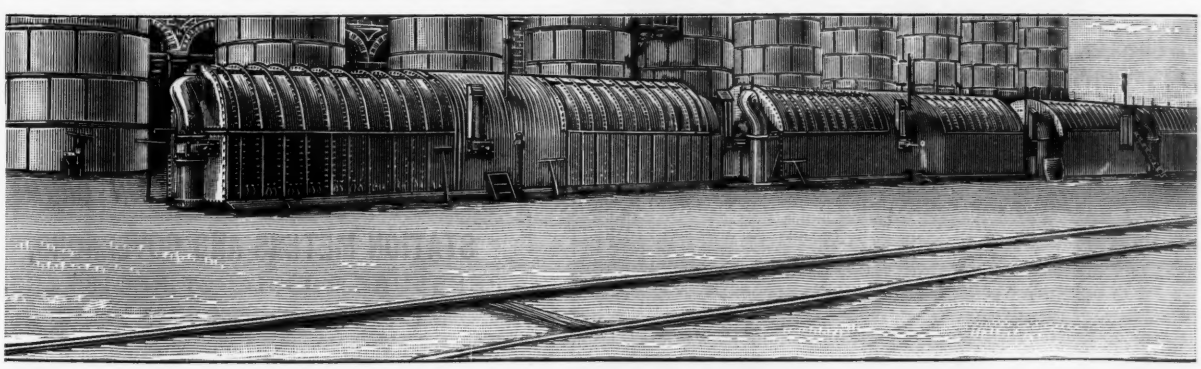


☛ **465 of these Machines (capable of dealing with 440,807,000 cubic feet of Gas daily) have been supplied, which fact is given as evidence of this apparatus being the Most Efficient of any in the Market for the extraction of Ammonia, Carbonic Acid, and Sulphuretted Hydrogen, from Coal Gas.**



View of SIX PATENT "STANDARD" WASHER-SCRUBBERS, erected at the Beckton Station of The Gaslight and Coke Company; the Engines driving same being under Galvanized Iron Covers. Six additional Machines are now in use at these Works.

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[ESTABLISHED 1844.] **ORIGINAL MAKERS.** [ESTABLISHED 1844.]

LONDON, 1851. NEW YORK, 1853. PARIS, 1855. LONDON, 1862. DUBLIN, 1865. PARIS, 1867.

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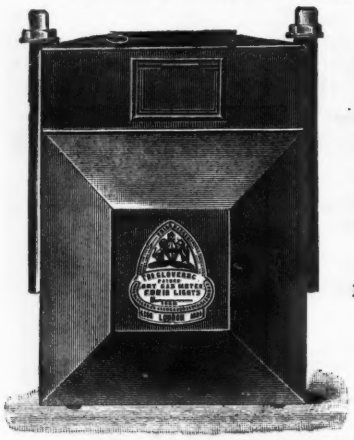
The latter being the Highest Award for Dry Gas-Meters at the Paris Exhibition, 1867. Since then we have not Exhibited FOR PRIZES.



1st.—Are a remedy for all the defects of Wet Meters.
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7th.—May be fixed either above or below the level of the Lights.
8th.—Cannot be tampered with without visibly damaging the outer case.
9th.—Will last much longer than Wet Meters.
10th.—Will not cost more than one-half for repair that Wet or Water Meters do.
Are upheld for five years without charge.

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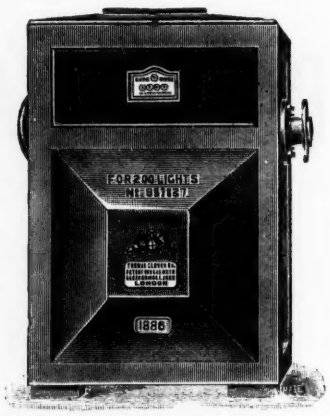

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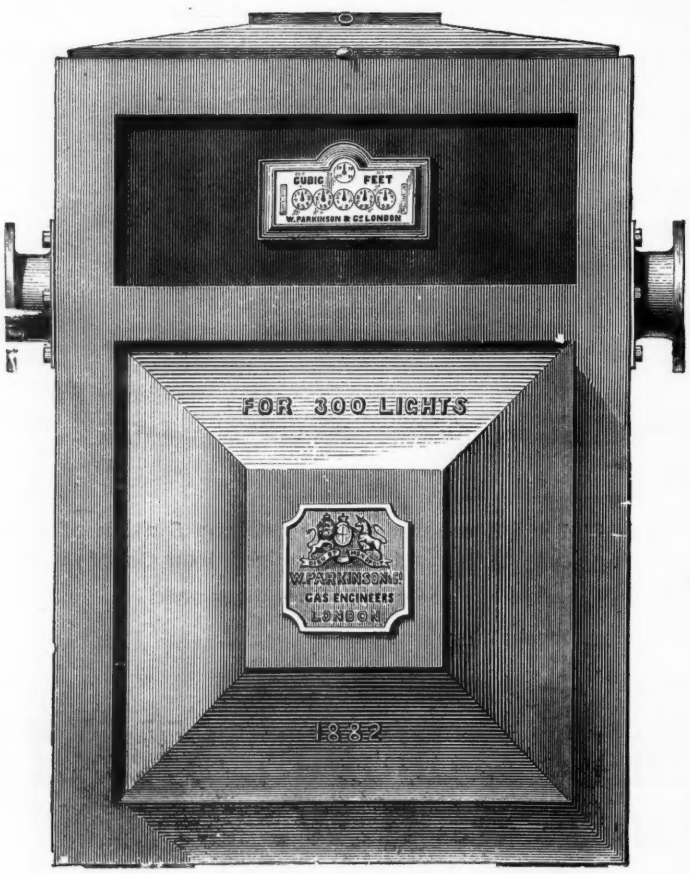

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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 6, 1893.

The Stourbridge Award.

In another part of the JOURNAL will be found an account of the proceedings before the Arbitrators in regard to the acquisition of the undertaking of the Stourbridge Gas Company by the Improvement Commissioners, in accordance with the terms of the Act of Parliament sanctioning the transfer. The Commissioners determined in December last to exercise their power of purchasing, and forthwith entered into negotiations with the Directors of the Company for taking over the property, at a price, as from the end of the current month. It soon appeared, however, that the parties held irreconcileable views respecting the number of years' purchase to be given for the ordinary dividends of the Company, which amount to £3450. There was consequently nothing for it but arbitration; and the reference came off on May 8, 9, and 11, at the Westminster Palace Hotel, before Mr. G. Livesey and Mr. T. Newbigging, representing the Commissioners and the Company, with Mr. J. Shiress Will, Q.C., as Umpire. Everything was done that precedent demanded. A strong band of Counsel, aided by a respectable corps of experts, did their best to puzzle the Arbitrators, who in their turn did what was expected of them by disagreeing; and so the business was settled by the intervention of the Umpire. The total claim of the Company was made up as follows: They asked for 31 years' purchase of the dividend, which came to £106,950. Adding to this 10 per cent. for compulsory sale, the amount becomes £117,645. An allowance for converting borrowed money on the basis of 31 years, with compensation for purchase, makes another £5199. In this way the gross amount of the claim was brought up to £122,844. The Commissioners put the value of the property at 25 years' purchase, which would be £86,250. The Umpire's award was £99,800; being, on the face of it, nearly 29 years' purchase. But the figure includes £9000, less half a year's dividend (£1681), in the shape of stocks, book debts, &c. Debentures and current contracts are outside the award, and will be taken over as they stand. On the 31st of December last the total share and loan capital amounted to £55,902. Although the Company were working under the sliding scale, it was expressly stipulated that this consideration should not affect the value of the property in the event of a transfer. There are many ways of looking at the result of this arbitration; but it may be roughly put that the proprietors will have to re-invest their returned capital at 3½ per cent., in order to get as much interest as the Company provided for them. Those who disagreed on the point before will do so still; and while one party to the settlement will urge that the purchase-money is too little, the other will say it is too much. Having regard to the actual state of the investment market, it is possible to hold that the balance has been very fairly held between the claims of the shareholders and the rights of the ratepayers. It would be difficult to name a first-rate investment, as lawyers use the term, that could be bought to-day to return 3½ per cent. interest upon the purchase-money. But then gas shares do not come into this category; and the expropriated Stourbridge shareholders cannot reasonably complain of having to turn their attention to investments of the second order. Looked at in another way, 29 years' purchase is a good price for dividends, even so well protected as those of the Stourbridge Gas Company; and although the Company could doubtless make out a fairly reasonable case for the higher price they demanded, they could not have expected to get everything they asked for. For the rest, the town is to be congratulated upon coming into possession of a thoroughly sound undertaking, in perfect order, and fortunate in remaining under the same able management that has brought it into the position which enabled Mr. Balfour Browne to rate its value so high.

The Bromley Gas Company's River Pollution Case.

For once—it is impossible to resist the temptation to put the matter thus—a Gas Company have been held innocent of causing damage attributed to them by a petitioner to the shrine of Justice, represented on this occasion by the Lord Chief Justice's Court. It was the case of *Sopp v. The Bromley Gas Consumers' Company* that has been so distinguished in demonstrating that Gas Companies cannot always be made answerable for disasters suffered by people who live within a few miles of their works; and the instance is worthy of notice, although the matter of it was simple enough. The plaintiff in this case is a miller on the Ravensbourne; his place being nearly four miles below the defendant's works. In January and February of last year, he lost a horse; and several others became ill. He and the "vets" called in professed to be mystified by the symptoms, until he heard that early in January there had been a leakage from one of the Bromley Gas Company's ammoniacal liquor tanks, which had killed a number of fish in the stream. This was sufficient for the miller, who at once concluded that what had killed the fish must have injured his horses. Unfortunately for this perfectly natural contention, the circumstances of distance, dates, and the character of the stream did not bear it out. It was not denied that the Gas Company's tank had leaked, or that some fish had been killed in consequence—for which the Company had duly paid compensation. This happened in

the early part of January, however; and on the 13th of the month the mischief was discovered, and remedied so effectually that three days later an officer of the Local Board tested the swift-running river, and found it all right again. It was not until some weeks later that the plaintiff's horses were taken ill. Moreover, the defence was able to show that the symptoms exhibited by these horses were absolutely consistent with influenza, while they were not consistent with the suggestion of poisoning; and also that other animals regularly watered in the stream had not suffered in the same or any other way. In short, the jury were asked to believe that a month after the leakage from the ammoniacal liquor tank had been stopped, one particular stud of horses, drinking from the rapid river nearly four miles lower down the stream, had been injured by this leakage. The jury could not accept this rendering of the facts; and they found for the defendants, for whom judgment was accordingly given. It is doubtful if the case would have ended so if the defence had not been able to show that there was a nearer cause for the injury the plaintiff had suffered than that laid to their door. This absolutely clinches the matter.

A Chapter of Accidents.

The eighth annual report of the Board of Gas and Electric Light Commissioners of the State of Massachusetts is published, and contains a mass of statistical and other information relating to the supply of gas and electric lighting in the area covered by the operations of the Board. Among other matters, the Board take cognizance of deaths due to inhaling illuminating gas. It is surprising to learn that the number of deaths reported to the Board in 1892 from different parts of the United States as due to this cause was 250. Of this number, 37 are returned as suicides; while the remainder are supposed to have been more or less accidental. It is not clear whether these figures include the Massachusetts cases, which are all described with some attempt at detail; but, at any rate, the deadliness of gas in America is sufficiently remarkable. Eight deaths are stated to have occurred where coal gas only is made; 70, where water gas is exclusively employed; and 119, where both coal and water gas are used. We are shrewdly of opinion that, if anything like these proportions were to be rivalled in the United Kingdom, somebody would speedily want to know the reason, and how to put a stop to it. Dead men proverbially tell no tales; and therefore it is impossible to say with certainty, when a bed-room gas-burner is found in the morning turned full on but unlighted, and the occupant of the room is discovered dead in his bed, whether the case is one of suicide or of death by misadventure. The following example, taken from among many similar instances, illustrates the way of these "accidents." A man arrived on the evening of Sunday, Sept. 4, at a Boston hotel, and was assigned a room on the third floor, to which he retired about ten o'clock. "He was found dead in bed about eight "o'clock on Monday morning, having been suffocated by "illuminating gas, which was escaping through a 4-foot "burner partly open. The room contained about 590 "cubic feet, being 12 feet by 11 feet and 7 feet high. There "was one door in the room, which was tightly closed, and "one window, about 2 ft. 8 in. by 4 ft. 6 in., slightly "open. The gas light was supposed to have been acci-"dentally extinguished." Very little notice appears to be taken of these cases; and one wonders what the State Board of Health can be about, that no ordinance is made rendering it compulsory upon hotel-keepers and householders burning the peculiarly deadly compound passing for illuminating gas in America to provide efficient ventilation for all sleeping-rooms supplied with gas-burners. It may be impossible to curb the suicidal propensities of miserable wretches who make the unlighted gas-burner the only too convenient substitute for the pan of charcoal beloved of French romanticists; but it can at least be ensured that the death penalty should not so frequently visit the careless, ignorant, or intoxicated handlers of the cheap and poor gas-fittings commonly found in a certain class of American as well as European houses.

Sir C. M. Palmer on Trade Depression.

There is a consolatory proverb which asserts that, when things have arrived at their worst, they begin to mend. It is difficult to extract from this saying all the comfort that its framers probably meant it to contain; because it is impossible to tell how far it is merely a play upon words, and how much living truth it expresses. Of course, there can be nothing worse than the worst; and, therefore, when the lowest possible point is touched, any movement must be upward. This reflection does not help us to know the worst when we encounter it, or to bear it while we are condemned to its company and effects. In a recent address by Sir C. M. Palmer, M.P., to the Newcastle-on-Tyne and Gateshead Chamber of Commerce, an attempt was made to show that the outlook for the trade of the country is rather better than is generally believed. This speech was a resolute essay upon the text of the proverb we have quoted; and it is worth referring to as an expression of the opinions of a man of business upon a state of trade which is distinctly enigmatical. What does it all mean—these colonial financial crises, these industrial troubles at home, the tariff regulations abroad, the depreciation of silver, the shrinkage of British outputs? Sir C. M. Palmer does not think it means much, provided that financial confidence is not destroyed. Industrial disputes at home are very annoying; and the demand of some workmen's advocates for a legal eight hours day is absurd enough. But these things will not hurt trade, so long as the workers do not entirely forfeit the confidence of capital. This, as the speaker pointed out, is a lesson that the working classes have yet to learn. We, employers and employed, in Free Trade England, are at the heart of the industrial world, and feel its every pulsation. In the United States, the people have tried to shelter themselves behind the M'Kinley tariff; but it is being discovered that these tariffs hurt those whom they are designed to protect more than those against whom they are aimed. The natural course of trade is bound to be resumed sooner or later. Then, again, with regard to the price of silver and its relation to gold, even since Sir C. M. Palmer spoke it has been pointed out that the world has probably seen the worst of this troublesome discrepancy. The output of silver is falling off, while that of gold is increasing. Whether this will have the effect of reducing poverty is a question for bimetallists to argue, and for the future to decide; but it may at least be said that if there is any harm done to trade by silver being too cheap, this condition is in a fair way of being rectified.

Prize Awards at Chicago.

The last bit of news about the Chicago Exhibition that has figured in the newspapers is with respect to a threatened withdrawal of the majority of the foreign exhibitors from the so-called competition for prize medals and diplomas, in consequence of their dissatisfaction with the system of adjudication favoured by the administration. It appears that the exhibitors prefer the jury system, as carried out at former exhibitions; whereas the administration contemplated an examination of exhibits by individual experts, whose reports were to be received and acted upon by a Committee of Awards. The storm has been quelled by the offer of a compromise between the two systems, which most of the malcontents have accepted; but all difficulty as to the awards can hardly be regarded as at an end. The newspapers seem to side with the malcontents as against the Exhibition authorities; but we are inclined to think the latter entitled to praise for their endeavours to dispense with the farce of the jury system in connection with the award of prize medals, which we have denounced for years. The rights of the Chicago protest, of course, depend upon the nature of the understanding or agreement arrived at between the authorities and the exhibitors; and with regard to this we know nothing to justify the offering of an opinion on the matter. At the same time, it is in order, as the Americans say, to point out that the prize-medal system is not a necessary feature of an industrial exhibition. Some of the most satisfactory and successful exhibitions ever held in this country have dispensed with it; and most of the scandals and heart-burnings that have attended enterprises of the kind have been directly attributable to the system. It is high time that the real and only attractiveness of exhibitions for manufacturers should be generally acknowledged. They are simply means of advertisement, and nothing more. An exhibitor values an exhibition for the orders it brings him; and there is no justification for any other "prize." If there must be these occasional collections of articles of commerce, which is not an axiomatic proposition, it should be sufficient for the exhibitors to have a certificate from the administration testifying to the fact of their participation,

and to the degree in which their co-operation has contributed to the general attractiveness of the show. Under the jury system, the biggest exhibitors always get the gold medals; and it would be as well if the real reason for this distinction were acknowledged.

Trade Union Vanity.

An observation has been made by our contemporary the *Engineer*, in the course of a commentary on the collapse of the Hull dockers' strike, which recalls something that transpired in connection with the equally unfortunate gas stokers' strikes of three and four years ago. It is remarked that "the dockers seem to have acted, in the first instance, "in the belief that they were skilled men. But dock "labour is only skilled in a very limited sense. Any man "with skill and energy can learn all there is to be learnt "in a very few days." It was exactly the same with the gas workers; and for the same reason. Once let a number of men, unaccustomed to close and accurate thinking, and still less practised in the use of the critical faculty, get together for the purpose of self-glorification and mutual admiration, and they will soon persuade themselves that they are individually and collectively the most wonderful fellows in the world, and cannot be matched or replaced. Before they are what is called "organized," most labourers are diffident enough, and do not pretend to be anything more than they really are. But with the formation of a Union, all this changes, and usually very much for the worse. Under the inspiring harangues of the professional Union organizers, the once simple labourer is brought to laugh at the distinction he was formerly ready to acknowledge between his rating in the industrial army and that of the tradesman. Indeed, men who are now, for the time being, Members of Parliament have told the labourers that the only reason why the skilled workers get higher pay than themselves is because of their strong Unions—the truth being, of course, that this is "putting "the cart before the horse," the skill of the worker constituting the strength of his position. This Union-inspired vanity manifests itself in various curious expressions. Before the gas stokers' strike, some of these men might have been heard expounding the essential difference between what they called "side work" and "straight "work" in charging retorts with the scoop—the former term applying to narrow retort-houses, in which the width of the charging-floor would only permit the scoop to be laid on the stage for filling parallel to the line of the stack instead of "end on," as in the latter style. To hear them, it would take a lifetime for a man used to "side work" to fall in with "straight work," and *vice versâ*. It is quite right and proper for a man to dignify his work, and take a pride in mastering its difficulties, whatever they may be; but when it comes to this exaggeration, it is easy to see how the vanity of the labourer lends itself to the impositions of the Union leader, who first creates it, then fosters it, and ultimately lives upon it.

Death of a Director of the Canterbury Gas and Water Company.—A vacancy has occurred on the Board of the Canterbury Gas and Water Company by the death of Mr. Fill, at the age of 74 years. Deceased was for many years a member of the Canterbury Town Council.

Societe Technique du Gaz en France.—The annual congress of this Society will take place in Paris on Tuesday next and the two following days; the meetings, as in previous years, being held in the hall of the Society of Civil Engineers. The business of the first day will comprise the admission of new members, the presentation of the reports, the award of premiums, and the delivery of the Inaugural Address of the President (M. Paul Mallet). If there is time, some of the papers will be taken on the first day, and the remainder on the mornings of the second and third days; the afternoons being reserved for visits to various works. There will be the usual banquet on the evening of the second day.

The Late Mr. S. R. Ogden.—At the monthly meeting of the Blackburn Town Council last Thursday, a vote of condolence with the family of the late Mr. S. R. Ogden was passed, and ordered to be forwarded by the Town Clerk. Alderman W. Thompson, in moving the resolution, said that Mr. Ogden had charge of the gas-works from the time the Corporation purchased them; and during that long number of years he conducted himself with credit—proving a most efficient Gas Engineer. He (Mr. Thompson) felt, as Chairman of the Gas Committee, that they had lost a most valuable officer, who was held in great esteem. Alderman Hoyle, who seconded the motion, also paid a high tribute to the deceased gentleman's capabilities.

WATER AND SANITARY AFFAIRS.

There are indications that the Royal Commissioners on Metropolitan Water Supply have not yet completed their investigation. Having sat twenty-nine days, the Chairman announced in the middle of February last that the Commissioners, as then advised, would not hear any further witnesses; but if it was found necessary to alter this decision, it was promised that due notice would be given of any future sitting, and the evidence required would be taken in public. We now understand that another sitting is likely to be held in the latter part of the present month. Presumably this is for the reception of further evidence, bearing on points of some importance. About three weeks ago, the Commissioners took a trip up the Thames for the purpose of observing the exact position of the intakes; the Companies being asked to assist in the identification by having a flag exhibited at each intake. Whether or not anything then observed gives rise to the further sitting, we cannot say. It may also be suggested that the state of the River Lea in relation to the Manifold Ditch invites renewed consideration. But the character of the supply, as derived from both the Thames and the Lea, is well established; and no evidence can refute the facts on record, which prove the remarkable purification effected by the filter-beds of the Companies. With respect to the duration of the inquiry, we may observe that, although the apparent delay in the production of the report may excite some degree of impatience, credit must be given to the Commissioners for the painstaking manner in which they are evidently fulfilling their instructions. It is essential that their inquiry should be complete in its character, and that their conclusions should have all the force which can be derived from a careful consideration of well-ascertained facts.

A curious point of law was raised the other day, before the Magistrates at Penge, by a gentleman resident in Bloomsbury, who described himself as "the unfortunate "owner" of several empty houses in Anerley. In respect to one of these houses, occupied by a caretaker, the Lambeth Water Company claimed payment for the water supply at the rate of two guineas per annum. The owner refused payment, and the supply was cut off accordingly. Thereupon Mr. Frend, the gentleman in question, applied for a summons against the Company; his contention being that their only legal claim was for £5 5s. 6d. per annum, based on the rateable value of the house. Had they asked for this amount, and he had refused payment, he considered they might legally have cut off the supply. But he contended that they had no right to enforce payment of the smaller amount; two guineas per annum being altogether outside the statute. As the demand was illegal, so was the cutting off. Such was the contention—the Company being in fault for asking too little. Yet Mr. Frend looked upon two guineas as too much; his idea being that twenty shillings would be plenty. The Magistrates having granted a summons, in order that the point at issue might be settled, the case came before them in due course last week, with the result that Mr. Frend was nonsuited, and mulcted in five guineas costs. This "unfortunate" consumer may now take comfort from the thought that he has really been dealt with "according to Act of Parliament;" it being his complaint at the outset that such was not the case. His Solicitor urged that the water charge should apply only to that part of the house which the caretaker occupied. It was also submitted that the "old woman" who was in residence only washed her hands twice a day. This is the kind of plea once prevalent in the City, where it was contended that the offices and warehouses consumed very little water. The agreement is one which runs at direct variance with the principles of sanitary administration; and happily it had no weight with the Magistrates at Penge, who were unanimous in dismissing the summons, after the facts of the case had been fully heard. Moreover, if the Company had no power to reduce their charge to two guineas per annum, still less were they authorized to come down to twenty shillings. If Mr. Frend was right in his notions of law, the Company must charge up to the hilt in order to enforce their demand. Consumers will not thank him for fighting such a battle.

The application recently made on behalf of the East London Water-Works Company to Mr. Dickinson, the Magistrate at the Thames Police Court, suggests considerations of very great importance to Water Companies

throughout the country. We are all familiar now-a-days with the outcry which is raised when the Companies, in the execution of powers entrusted to them by the Legislature, have to adopt the extreme course of cutting off the water supply, either because the consumer has failed to pay the rates or in order to remedy a leakage from the communication-pipe. Of course, the percentage of cases in which the supply is really discontinued is infinitesimal when it is compared with the enormous number of consumers with whom the Water Companies are brought into business relations; yet it is essential that the Companies should have the power to cut off, though, in a general way, it is found sufficient to regard it in the light of a reserve force. In the case of the East London Company, as their Solicitor informed the Magistrate, it has hitherto been the practice, in cases of default, to disconnect the water supply; but the Company, in view of the danger to health which might arise from such a practice, have desired to abandon it, in so far as they are able to do so with justice to those whose interests are committed to their charge. It is obvious, however, that if this ready remedy is not to be resorted to when occasion arises, the Company ought to be afforded the necessary facilities for asserting their rights in another way. The East London Company propose henceforth to recover their rates through the medium of the Police Court; and the Solicitor who made this announcement expressed the very natural hope that the decision would commend itself to the approval of the Magistrate and of the public generally. At present, unfortunately, the Magistrate has shown only a qualified approval of the new departure; while, as to the public, it is to be feared that the hope breathed by the legal gentleman referred to is scarcely likely to be realized until (if the day ever comes) consumers have arrived at a more reasonable appreciation of a Water Company's general position and necessary rights. The Solicitor was requested by the Magistrate to renew his application; and this he did, as reported in the last issue of the JOURNAL (p. 1010); with the result that the Magistrate expressed himself as being unwilling to "summon persons and order them "to pay for what they had not received."

This unexpected attitude indicates a curious view of the law, or else it suggests the idea that Mr. Dickinson had not had time to refer to the statutes. Section 70 of the Water-Works Clauses Act, 1847, is tolerably explicit in its terms. It provides that the rates shall be paid in advance by equal quarterly payments, and that the first payment shall be made at the time when the pipe by which water is supplied is made to communicate with the pipes of the undertakers, or at the time when the agreement to take water is made. The Act also points out the summary method in which rates may be recovered. Yet Mr. Dickinson has hazarded the opinion that the Police Court is not the proper place in which to try such cases, regardless of the fact that the Legislature has directed otherwise. In the first place, it is perfectly clear that the rates are legally payable in advance. Secondly, if they were not so payable, in a vast number of cases they would never be paid at all; or, as was pointed out to the Magistrate, even in the case of those who are prepared to pay for water consumed on their premises, if the Companies had to wait for three months instead of having the money in advance, they would be deprived of the use of many thousands of pounds during this period, and would be hampered in the execution of their public duties. The learned Magistrate seemed to think that the Companies ought to sue for rates in the County Courts, where, as he said, the costs would be lower and the proceedings more expeditious. This, however, is not the opinion of most persons who are familiar with County Court procedure. The costs can hardly be said to be less; and as to expedition, it is well known that proceedings are often of the most dilatory character—sometimes a fortnight or more elapsing between the issue of the summons and the date of its return, to say nothing of the time subsequently allowed for payment of the debt, either in one sum or by instalments. We hold that it would simply be intolerable that the Companies, when they wish to avoid extreme measures, should be driven into the County Court for the purpose of recovering statutory debts respecting which there is no dispute. It would be equally reasonable to argue that the rates levied by Local Authorities ought also to be enforced in the County Court, or not at all. We earnestly hope, therefore, that no unnecessary or unreasonable obstacles will be placed in the way of the Water Companies, whose duty and desire it is to consider the public welfare, but who, nevertheless, have statutory rights which they will be bound to enforce if Magistrates, in London or elsewhere, should be reluctant to give effect to the plain intention of the Legislature in cases of the class referred to.

The foregoing remarks are intended to be of general application, and they are in nowise affected by the course which, acting under magisterial pressure, the East London Company have now decided to adopt. On Thursday last, the Company's advocate informed Mr. Dickinson that his clients would waive their rights in regard to requiring payment in advance, and there, for the present, the matter ends. It is to be hoped, however, that the diplomatic concession thus made may not have the effect of inflicting loss upon the shareholders, and that the precedent will not be considered binding on other Water Companies, if and when they should feel called upon to enforce their legal rights and statutory remedies.

Mr. W. Chew, Assistant Gas Engineer and also Electrical Engineer to the Blackpool Corporation, has been elected a full member of the Institution of Electrical Engineers. As far as we are aware, Mr. Chew is the first representative of the gas industry in this country who has become entitled to membership of the Institution.

Mr. Livesey's Gas Institution Paper: A Correction.—Our attention has been called to a misarrangement of the figures in the column showing the average gas-rental per consumer in the table on p. 870 of the JOURNAL for the 16th ult. They should have appeared as pounds and decimals—thus: £11·10, £9·6, £5·8, and £4·6—and not as pounds, shillings, and pence.

The Gas and Water Question at Accrington.—We learn from a local correspondent that the dispute between the Accrington Gas and Water Company and the Local Authorities is likely to be settled amicably after all. Acting on the advice of Counsel, the Local Authorities have offered to purchase the undertaking; agreeing to pay annuities equivalent to the dividends now being received by the shareholders.

Marriage of Miss Ella C. Andrews.—Last Thursday morning the works of the Swansea Gas Company wore a festive appearance; the occasion being the marriage of Miss Ella Constance Andrews, second daughter of Mr. Thornton Andrews, M.Inst.C.E., the Company's Engineer and Secretary, with Mr. Arnold Miller, Deputy Town Clerk and Deputy Clerk of the Peace. Among the large number of wedding presents was a valuable and handsome "canteen" of silver from the Directors of the Company. The case stood 2 feet high, and contained three drawers filled with a liberal service of spoons, knives, forks, &c., for the dinner, tea, and dessert table. The officials of the Company gave a spirit "Tantalus;" and the employees, a very fine clock.

Institution of Civil Engineers.—The annual general meeting of this Institution was held last Tuesday, to consider the report of the outgoing Council, with the statement of accounts, and to elect the Council and officers for the ensuing session. The President (Mr. Harrison Hayter) occupied the chair. The tabular statement of the transfers, elections, deaths, and resignations during the year showed an effective increase of 207 on the previous total of 5371, or at the rate of 3⅞ per cent. per annum; while as regards the students, the decrease was 49. The gross numbers on the books on the 31st of March, 1892 and 1893, were 6239 and 6397 respectively. The strict income last year amounted to £20,854—an increase of nearly £800 on the former year, to which had to be added £3980 on account of capital, and £442 for trust funds; bringing up the total receipts to £25,276. The general expenditure was £16,527 (including £7750 for publications), and £522 for premiums; while there was invested £8254 in British railway debenture stocks of the nominal value of £7000. Thus the total was £25,304. The summary of investments showed that there stood to the credit of the Institution £111,400, with trust funds of the par value of £15,606. Among the papers read at the ordinary meetings during the past session was one by Mr. J. Emerson Dowson, on "Gas Power for Electric Lighting." The first "James Forrest Lecture" was delivered by Dr. W. Anderson, F.R.S., on the 4th ult.—the anniversary of the election of the Secretary as an associate in 1852—the subject being "The Interdependence of Abstract Science and Engineering." (This lecture was noticed in the JOURNAL last week.) With regard to the supplemental meetings for students, the Council expressed regret that neither as regarded the merit of the papers read nor the attendances could they be considered successful. The report was adopted. The ballot for the Council resulted in the election of Mr. Alfred Giles as President; of Sir R. Rawlinson, K.C.B., Sir B. Baker, K.C.M.G., Sir J. N. Douglass, and Mr. J. W. Barry as Vice-Presidents; and of Dr. W. Anderson, Sir Douglas Fox, Sir C. A. Hartley, K.C.M.G., Mr. A. R. Binnie, Mr. J. C. Hawkshaw, Mr. C. Hawksley, Professor A. B. W. Kennedy, Sir Bradford Leslie, K.C.I.E., Mr. J. Mansergh, Sir Guilford Molesworth, K.C.I.E., Mr. W. H. Preece, Sir E. J. Reed, K.C.B., and Messrs. W. Shelford, F. W. Webb, and W. H. White, C.B., as other members of Council.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1058.)

THE Stock Markets during the past week have been in a generally unsettled condition. Colonial affairs were easier; but an important depressing factor was furnished from the United States, and, up to the present time, the outlook of things there is no better. The settlement, though less disastrous than its predecessor, proved insuperable to six members; while some others were hardly pushed to get through. Apprehension and distrust thus weakened prices in general pretty well all round; while the normal bulk of business was reduced by the counter-attractions of Epsom races. The Money Market has fallen to a point of extreme ease. A reduction in the Bank rate to 3 per cent. was widely expected on Thursday; but the Directors thought it advisable to keep it up for another week at all events. In the Gas Market, business has been about up to an average, though transactions were mostly confined to the heavier issues. In Gaslights, the "A" was active, and very steady—opening and closing at 219½, without any wide divergence through the week. None of the debenture or preference issues were touched; but there were a few dealings at moderate figures in the "H" limited 7 per cent. South Metropolitans were dull at first, but awoke into activity later in the week; and business was brisk, but quotations made no sign of a move. Little was done in Commercials, but that little showed nice figures. The Suburban and Provincial Companies exhibited their usual quiescence; but an advance in value was effected by Brentford. Among the Continental undertakings, Imperial was the most busy, and it picked up one of the points it dropped the week before; but Continental Union retrograded a couple. Several of the minor Companies have moved, for the most part upwards. Malta and Ottoman are a little higher. Monte Video rose in view of the maintenance of the 5 per cent. dividend; and Chicago second bonds are quoted fractionally higher, possibly in anticipation of the World's Fair proving profitable to the Company's rental. San Paulo, however, had a fall. The Water Companies were quiet, and for the most part steady, though Southwark and West Middlesex made a slight move downwards.

The daily operations were: The Gas Market opened very sluggishly on Monday; and at no time was there any activity—prices being about a good medium. West Middlesex Water went down 3. Tuesday was rather more brisk; and prices generally were a little better, though Continental Union fell 2. Wednesday was a very quiet day, and nothing moved. On Thursday, there was a resumption of activity, especially in Gaslights, South Metropolitans, and Imperial Continental. The latter advanced 1; Melbourne debentures did the like; and Monte Video improved ½. Business was fairly well kept up on Friday, but was not quite so brisk. Brentford old advanced 1½; and Malta and Ottoman, ¼ each. In Water, Southwark and Vauxhall receded 2. Saturday was saved from its customary quietude by several dealings in South Metropolitan "B," at steady figures. All quotations closed without further variation.

ELECTRIC LIGHTING MEMORANDA.

The Joint Committee on Earth Return Currents—A Common Property of the Earth—The Delusion of "French Measurement" Again.

THE appointment of a Joint Committee of both Houses of Parliament to consider and report upon the question "whether the grant of statutory powers to use electricity ought to be qualified by any prohibition or restriction as to earth return currents, or by any provisions as to leakage, induction, or similar matters; and, if so, in what cases and under what conditions," which was mentioned in last week's JOURNAL, is a concession in the first place to the Board of Trade, and secondly to the Telephone Company. As the reference to the Committee is quite general, however, it would appear that every interest liable to be prejudicially affected by users of electricity under statutory powers ought to have *locus standi* before the Committee. The appointment of the Committee is an outcome of the action that has invariably been taken by the Telephone Company whenever proposals for working tramways by electricity have come before the Board of Trade. Telephones use a very mild current of electricity; and this is liable to be interfered with by neighbouring strong currents, whether used for traction or for lighting. The former interest, however, being first in the field, it has always sought protection from the Board of Trade as against the latter, and has generally, but not invariably succeeded. In order to avoid this piecemeal method of defending itself, the telephone interest approached the Board with a view to the adoption of a Standing Order for the insertion of a saving clause in future Electric Traction Bills and Orders. To such a sweeping procedure the electric traction interest naturally objects; and the Board of Trade, being exposed to pressure on both sides, has invoked Parliament for the purpose of having the difficulty settled.

The principle underlying the contention referred to in the preceding paragraph is a curious illustration of the encroachment of man upon the common properties of the earth. Among other matters which have hitherto been as free as the air to anybody who wants to make use of them are the electrical qualities of the earth, which, as the schools now say, is to be regarded as being a huge magnet. "Earths" have been used accordingly to complete circuits designed for transmitting signals of various kinds. So long as these users are of approximately the same character, any number of them may be established without interfering with one another. The intrusion of one fresh user of a different kind, however, may demonstrably destroy all the others. The nice question consequently arises whether the first comers can be held to have acquired such a right to the use of the electrical properties of the earth, as to debar everybody else who wants to employ them differently from doing so to their injury. On the other hand, it is very hard that a user such as that of the telephone service, which is of great public utility and has been established at very heavy cost, should be spoilt by a new comer which can only plead expediency at best, not necessity, for its appearance on the scene.

From a statement appearing in an electrical contemporary, we gather that even in the land of their creation and nurture people who yet retain some regard for truth are beginning to tire of the terms "2000-candle power," "1200-candle power," and so forth, as applied to electric arc lamps. The Chicago electricians at least admit the delusiveness of such terms; and they have addressed a special appeal to Professor Elisha Gray to forbid their use at their forthcoming electricians' congress, which is to be held in connection with the Exhibition. It is suggested that litigation and annoyance arising out of the evil practice of rating arc lamps by these conventional candle measurements would be saved by the adoption of a new definition, worded as follows: "The term 2000-candle power arc lamp is to mean an arc produced by 10 ampères and 45 volts potential difference between the carbons; or a 450-watt arc. The candle power of arcs produced by currents of more or less ampères, or more or fewer volts difference of potential, to be rated proportionately." Our contemporary remarks that this would be a rational system, and would probably commend itself to everybody, "except those who pay for the light." It goes on to assert that there is in the public mind an "ingrained disbelief with regard to the accuracy of electrical measurements—*a relic, no doubt, of the gas age.*" The italics are ours. We desire to offer a few remarks upon this statement, and the commentary supplied by our contemporary. The reference to the influence of the "gas age" upon this now antique fraud of the 2000-candle power arc lamp, is scarcely honest. The gas age is still with us, as the electricians know to their cost; and whatever relics it may leave beside the path of its progressive development, the impudent imposition of "French measurement" of arc lamps is certainly not one of them. Credit, or discredit, for this should be given where it is due, which has before been indicated. We do not know the name of the genius who invented the term in question; but his dodge was more instrumental in getting orders for street lighting from unsuspicious local authorities than anything else that could be named out of the manifold resources of the modern electric light speculator. The term 2000-candle power lamp is now admitted to be a convention—that is to say, like the beauties referred to in Charles Lever's song, it "never lived, except in dhrames; nor shone, except on paper." But it was once treated as a fact; and the increased illumination offered by the electrical touts in return for a higher lighting bill was always computed by taking every arc lamp as actually giving 2000-candle power. The same thing probably goes on to this day in the dark places of the earth. How this delusion, which paid the electricians so well to foster, can be laid to the score of gas, is hard to understand. It had a close connection with the equally irrational, but more obviously ridiculous, idea of "tower lighting," which was born about the same time and of the same stock. This latter notion, however, has gone the way of most of the children of "Grandfather" Brush; and only the 2000-candle power lamp remains to testify to the fact that imposition has had as real a part as science in the development of the electric lighting trade.

PROFIT-SHARING EXPLAINED AND DEFENDED.

IN pursuance of our policy of bringing under the notice of readers of the JOURNAL such modern teachings in Political Economy as (*pace* Dr. W. Anderson) it is as necessary for all employers of labour and workmen to become acquainted with as it is for the former to equip their establishments with the best and newest tools, and for the latter to learn to use them, we have to draw attention to the recent publication by Messrs. Methuen and Co. of a book by Mr. T. W. Bushill, of Coventry.* which is admittedly one of the fruits of the Labour Commission. It will be remembered that Mr. Bushill was invited, as a pioneer in profit-sharing in England, to give evidence before the Commission; and this he did in a manner that drew the eyes of an interested, and somewhat surprised, public to the remarkably promising experiment which his firm have been carrying on since 1888. These statements went very far to show that while demagogues had been spouting about the good times

* "Profit-Sharing and the Labour Question." By T. W. Bushill, a Profit-Sharing Employer; with an introduction by Sedley Taylor. London: Methuen and Co.; 1893.

that workmen may expect to come with the triumph of Socialism, and only then, the Golden Age had already been inaugurated by a simple, unobtrusive printer and bookbinder in Coventry, who was actually working out, with common, every-day materials, the most pressing formulæ of the tremendous problem that has been created by industrial civilization for the puzzling of humanitarians. How to reconcile the interests of employers and employed in trades and manufactures organized in the modern method—how to restore to the worker for wages that property in the ultimate value of his product which the independent craftsman enjoyed until the factory system placed the master workman at a disadvantage as compared with the "hand"—that was the first object of Mr. Bushill's solicitude; and as he told the Labour Commission of his proceedings and results, after some years of experience, he now also tells the public his thoughts, principles, and opinions upon the general subject.

Mr. Bushill's case is another illustration of the force of an idea—of the power there is in a thought. As we are reminded in the forefront of this book, so long ago as 1843 Carlyle asked "whether in some ulterior, perhaps some not far distant stage of this 'Chivalry of Labour,' your Master-Worker may not find it possible, and needful, to grant his workers permanent *interest* in his enterprise and theirs?" Some forty-one years later, Mr. Sedley Taylor published the first English book "containing anything like a general survey of profit-sharing undertakings in industry, agriculture, and trade." Meanwhile, Mr. Ruskin had been denouncing the iniquities that found shelter under the mantle of the old Economists. All these suggestions seem to have struck home to the appreciative faculty of Mr. T. W. Bushill, who succeeded in 1878 to the management of the printing and bookbinding business founded in 1857 by his father, now deceased. As he says, the business when he and his brother were left to carry it on was sound and fair-sized. But it was barely developed; and the limited amount of capital the brothers had at command made it for a short time doubtful whether they could carry it on. This doubt did not last long, however; and some years later, after the business had become consolidated, the managing partner's conscience was pricked by a remark of a thoughtful mechanic, to the effect that "he did not believe in the applauded munificence of employers who built churches or endowed large charities out of a fortune which they had got together while paying their men practically only a subsistence wage." This new commentary on the old proverb about charity beginning at home seems to have rankled in Mr. Bushill's mind, until he obtained light from Mr. Sedley Taylor's little book; and eventually the partners "happily agreed to try—at first, for one year only—a scheme which was drawn up with the valuable aid of Mr. Sedley Taylor and a sympathetic legal adviser, Mr. Browell, the Town Clerk of Coventry."

It is neither necessary for our present purpose, nor would it be fair to the author, to reproduce all he has to say in his book about the nature and working of this scheme. All employers of labour are advised to procure the book itself and to master its contents. Any profit-sharing scheme, applied to any kind of business, may or may not strike a critic as being perfectly appropriate; but the principle is the main thing. Messrs. Bushill and Sons had to make a start somehow, and they necessarily started with certain assumptions, the validity of which was a matter for private judgment to decide. It by no means follows that their assumptions would hold good at another time, or for another trade. So far as the case in point goes, however, the data were happily ascertained. This was brought out by a *plébiscite* taken to obtain the unconstrained opinions of the workpeople when it was known that the Labour Commission would welcome evidence on the results of the profit-sharing system. The voting, if it may be so styled, was as secret as the ballot; every adult person having experience of the working of the system being invited to send in anonymously his or her opinion respecting it. The practical agreement of the evidence thus collected is very strikingly in favour of the system.

One workman consulted in this way offered an observation which goes to the root of an objection that is frequently taken to the idea of profit-sharing. He stated that, in his opinion, "the principle is very good, and undoubtedly more beneficial to the workman than the employer. I look upon it as a *free gift*, for I should have had to work had nothing of the kind ever been started." Now, says the critic, if a thing of this kind is a free gift, how can it be a right? and if it is no right, what is there for the workman to rely upon? How does he know that the profit bonus may not be taken from him at any moment? As a matter of fact, he does not know. The success or failure of a business does not depend in the last resort upon the individual workman. It is in the main influenced by markets and management. Not all the devotion of all the profit-sharing stokers in the service (say) of the South Metropolitan Gas Company could do as much in the way of dividend-earning for the undertaking as the turn of the market which enables the new coal contracts to be placed at a reduction upon the old figure, and the vigilance that takes proper advantage of this circumstance. This, however, is not the point, which is that, all other things being equal, there is a difference in any business between faithful and willing, or listless and perfunctory service, which it is worth the employer's while to secure, and which can be easily secured by this system of profit-sharing. Mr. Bushill quotes, as the key to his success in this regard, the teaching of Ruskin: "The largest quantity of work will not be done by this curious engine [the workman] for pay, or by help of any kind of fuel which may be applied by the chaldron. It will be done only when the motive force—that is to say, the will or spirit—of the creature is brought to its greatest strength by its own proper fuel—namely, by the affections." This is the utterance of a highly unpractical gentleman, but nevertheless one who has had more than a few glimpses of Truth in his time. The sense of it is confirmed by the Homestead riots of Pittsburgh, where the most rancorous enemies of the employers were men with banking accounts and house property standing in their name. Indeed, it is not high wages that will ever render the typical workman content. The higher the wage, the more he will be persuaded that he is being exploited by the selfish and greedy capitalist. Whatever the scale of pay, be it 5s. or £5 per day, contentment can only come when the earner is convinced that he really gets as much as he deserves. If a system of profit-sharing will establish this conviction, then it is good for much, whatever may be its incidental defects.

There is a curious point for gas managers in Messrs. Bushill's enumeration of "typical satisfactory incidents" illustrative of the effect of profit-sharing upon the factory hands. The gas was turned down without orders when the workrooms were left; and, as a general result, there was a saving in the gas bill for the year, though more work was got through. Well might Mr. R. A. Hadfield, the Managing Director of Hadfield's Steel Foundry Company, Sheffield, in writing to Messrs. Bushill and Sons, say how very much amused he was with the result of the year's working on the gas bill. "After all, it is the introduction of little economies that bring the big profits." Anything that saves unnecessary waste of gas in a factory is worth noting; and if the same course could be pursued in private households, the popularity of gas cooking and heating stoves would increase by leaps and bounds.

It must not be supposed that Mr. Bushill has nothing to say in his book of other profit-sharing ventures than his own. He naturally treats at greatest length of that with which he is best acquainted; but he gives many statistics relating to other examples taken from every kind of business, from quarrying stone to publishing books—including gas manufacture, tar distilling, and mechanical engineering. These instances make up a present total of four industrial partnerships, with 700 employees, and seventy-one profit-sharing firms, with about 19,000 employees. In addition to these, it is recognized that there are many other firms that give to their employees, in addition to their wages, a bonus, the amount of which is not fixed beforehand, and which is payable in a variety of ways. Indeed, it is one of the most encouraging features of the movement that so many different attempts are in progress to arrive at a satisfactory solution of the problem. It is difficult, moreover, to draw up anything like a complete and reliable list of these experiments; for many business firms, doing a competitive trade, are loth to have their names and working systems published for the benefit of those who might make improper use of the information. Mr. Schloss contends that, as a matter of fact, "we have in Great Britain more cases of genuine "profit-sharing than there are in any other country," although, so far as can be gathered, the idea is not of British origin.

Finally, it is only fair to Mr. Bushill to point out that he does not uphold profit-sharing as a panacea, but only as a "safe expedient." As compared with schemes for municipalizing labour, and so forth, he admits it to be modest and commonplace; but then it has the advantage of being immediately practicable. "The stimulus to inventiveness and progress, which is unquestionably a feature of individualism, is conserved; but the much-needed socializing influence is added. The beauty of the thing is that it brings additional wealth to those who are very much in need of additional wealth, while at the same time it prepares them to deal with it properly." The idea is not advocated as the end, but as the next thing to be done. If it can be shown that the principle is opposed to the real interests of workers, Mr. Bushill declares that he will be quite ready to reconsider his position. In the meantime, it is claimed to be the best means of establishing a connection or community of interest between the employers and employed in most industries. In this general conclusion, we are disposed to agree.

Queen's Birthday Honours.—Among the honours which Her Majesty has been pleased to confer on the occasion of the anniversary of her birthday, we notice the following: A peerage for Sir T. H. Farrer, Bart.; a baronetcy for Mr. J. Joicey, M.P.; and a knighthood for Dr. B. W. Richardson, F.R.S. The new peer was educated for the legal profession, and was called to the Bar in 1844. He was for many years Permanent Secretary to the Board of Trade—a post which he held until 1886. He is a member of the London County Council; and his criticism of the policy of the Council in regard to work and wages was recently noticed in our columns. The new baronet is one of the largest coal-owners in the North of England. He is a Deputy-Lieutenant, a Justice of the Peace, and a Director of the North-Eastern Railway Company. Dr. Benjamin Ward Richardson is well known for his lectures and writings on hygienic, medical, and scientific subjects.

COMMUNICATED ARTICLE.

COAL GAS: ITS MANUFACTURE, DISTRIBUTION, AND CONSUMPTION.

A Series of Articles for Gas Students.

(*Continued from p.* 882.)

IN THE LABORATORY.

The Composition of Coal Gas.

As delivered into the holders on the works, the gas is the purified article of commerce; and it is passed thence direct into the district mains for consumption as required.

As already stated, coal gas is no definite chemical compound of known composition, but a mixture of various compounds, themselves more or less complex and unstable; and its composition is liable to constant variation day by day, even in the same works and under similar working conditions. An ordinary sample of purified gas may comprise the following:—

Illuminants.	Naphthalene. Benzene, toluene, and xylene. Acetylene, allyene, crotonylene. Ethylene, or "olefiant gas," propylene, butylene, &c. Methane, or "marsh gas" (but feebly an illuminant), ethane, propane, butane, &c.
Combustible Diluents.	Hydrogen, carbon monoxide, methane (see above, and note at foot).
Non-combustible Diluents.	Oxygen, nitrogen, air, carbon dioxide.
Impurities.	Carbon-dioxide (see also above). "Sulphur compounds" (principally bisulphide of carbon, and also sulphocyanides). Ammonia (trace or none).

NOTE.—*Naphthalene*, normally a solid, is often present in the vapour form. Its presence in coal gas is due indirectly to high temperatures of distillation; but, probably rather to the slight decomposition of other hydrocarbons, such as benzol ($C_6 H_6$), with resultant liberation of carbon and hydrogen, than to its direct formation in the retort. In the vapour form, it is the richest and most valuable of the hydrocarbons. If it deposits, however, it at once becomes an unmitigated nuisance; not only causing endless trouble by stopping up supply-pipes with its white crystalline formation, but also, in all probability, carrying down with it other valuable hydrocarbons, to the great detriment of the gas. *Methane.*—When this gas burns at ordinary temperatures, it is non-luminous. At high temperatures, some of it is broken up into acetylene, which gives it distinct luminosity (Professor Vivian B. Lewes).* Hence its inclusion in the above list of illuminants, which, moreover, is arranged in groups or series; these groups being known by the first mentioned in each group, thus: The "marsh gas series," the "olefiant gas series," &c. The student should compare the above list with that given in a previous article, and comprising the usual constituents of crude gas.†

Professor Lewes, in the second of his Cantor Lectures, 1890, gives the following analysis of a London gas, as regards the percentage volumes of the various illuminants* named:—

Illuminants	Hydrogen	47·9	
	Ethylene series	3·5	Total hydrocarbons, 45·6 per cent.
	Benzene ,,	0·9	
	Methane ,, (by paraffin)	7·9	
	,, ,, (by explosion)	33·3	
	Carbonic oxide	6·0	
	Carbon dioxide	0·0	
	Oxygen	0·5	
	Nitrogen	0·0	
		100·0	

As regards the relative values of these hydrocarbons, the same authority submitted the following table:—

Illuminating Value of Hydrocarbons per 5 Cubic Feet of Vapour.

	Candles.
Methane (see also note above)	5·2
Ethane	35·7
Propane	56·7
Ethylene	70·0
Benzene	420·0
Toluene	741·7
Naphthalene	900·0

Estimating Illuminating Power from the Jet Photometer, &c.

Kirkham and Sugg's improved form of Lowe's jet photometer is similar in construction to King's pressure-gauge; but it is of more delicate adjustment, and is provided, in addition, with a jet, whence the gas issues and burns with a flame of stated length (7 inches), and also a lever inlet-cock with a graduated scale, and an arrangement for readily readjusting the water-line. The instrument is, in reality, a specific gravity test; and it is constructed and applied upon the principle that the illuminating power of coal gas depends upon its density. Although theoretically this is not necessarily the case (as, in the event of there being present an undue proportion of non-luminous gases of high density, such as carbon dioxide, &c., the illuminating power and specific gravity might possibly be found to vary inversely), yet practically the composition of the gas, under ordinary manufacturing conditions, does not vary to any great extent, and is sufficiently constant to allow for its specific gravity giving, as a rule, an *approximate* idea of its illuminating power. The jet photometer is therefore useful as an aid to roughly estimating the luminiferous value, or in indicating any abnormal changes in the quality of the gas *as made;* and for this purpose it is generally connected to the gasholder inlet. The principle of its action is as follows: The length of flame being kept constant (and also, of course, the burner orifice), the pressure required to maintain this and the rate of consumption, will depend upon the density of the gas. Hence, the lower the density and, by the before-mentioned theory, the illuminating power, the greater the pressure and rate of consumption required to maintain the requisite length of flame; and, *vice versâ*, the higher the density, the less gas is required to fulfil the same condition. These two particulars of pressure and consumption are indicated on the scales already noted. A not unusual practice is to maintain the pressure and rate of consumption *constant*, and to take observations of the indicated quality, by the length of flame, which in such case must itself vary, according to the illuminating power of the gas.

Thorpe and Tasker's jet photometer differs somewhat from the foregoing, and is constructed upon the following principle: The flow of gas through an orifice of constant area will vary as the pressure to which it is subjected; or, the pressure remaining constant, the rate of flow will vary in proportion to the area of the orifice. In this instrument, the gas passes upwards towards the jet through a tube, the lower portion of which is of glass, in which works an indicator; the upper portion being slightly conical in the interior, and having floating in it a disc, kept in equilibrium by the pressure of gas, and suitably connected by a light rod to the indicator below. The disc is smaller in diameter than the tube; the annular space between them providing the gas-way to the burner. The area of this gas-way, and with it the rate of consumption and pressure at the jet, must vary according to the position of the disc in the conical tube; and it may be so adjusted, by means of a micrometer screw on the gas inlet, as to give the requisite length of flame from the jet. A graduated scale on either side of the before-mentioned indicator below is prepared in accordance with the relation between the position of the disc in the tube (and therefore the rate of consumption and the pressure at the jet), and the approximate illuminating power of the gas. The length of flame being, therefore, properly adjusted, a glance at the indicator gives the observer a ready estimate of the luminiferous value of the gas.

Sugg's illuminating power meter gives its indications from actual measurement of the rate of consumption; these also depending upon the approximate relation of density to illuminating power. Instead of the jet, an Argand burner is employed; the flow of the gas being so adjusted as to produce a flame 3 inches in height. The instrument comprises a meter and minute clock, so that upon the length of the flame being properly adjusted, the illuminating power is indicated according to the actual rate at which the gas is being consumed.

GAS TESTING.

On leaving the works, the gas must be subjected to careful examination, principally with a view to ascertaining how far it complies with such statutory requirements as may be imposed upon the undertaking. These apply chiefly to the light-giving properties, or "illuminating power;" and to its freedom from sulphuretted hydrogen, from "sulphur compounds" as defined above, and from ammonia.

Photometry.

The illuminating power of coal gas is ascertained by means of photometry—*i.e.*, the art of measuring the intensity of light (from Greek *phos*, light, and *metron*, a measure). The practice of photometry is based upon the following law: *Rays of light diverge in all directions from a given source of illumination with an intensity that varies in inverse proportion to the square of the distance from the illuminant.* For instance, the comparative intensities of illumination upon a disc at distances from the illuminant of (say) 1, 4, 8, and 12, will be 12^2, 8^2, 4^2, and 1^2, or 144, 64, 16, and 1 respectively. In other words, the intensity of the light emitted upon the disc at distances of 12, 8, or 4, will be 1-144th, 1-64th, or 1-16th, respectively, that of the intensity of the light from the same source upon the same disc, but at a distance of only 1 from the radius.

The practice of photometry as applied to coal gas embodies the comparison of the latter, consumed under specified conditions, with a "standard of light" which is assumed to be of known constant intensity—*i.e.*, to give out, under all circumstances, the same amount of light; or, failing this, to provide in itself data whereby the exact equivalent of light emitted by it may be calculated. The means adopted in this country for instituting this comparison include, on the one hand, a standard burner in which the gas is consumed at the rate of 5 cubic feet per hour, and, on the other, the "standard of light"—*i.e.*, two sperm candles, of six to the pound, each burning at the rate of 120 grains of sperm per hour. Between the two lights, and placed at right angles to an imaginary line drawn between them, is a disc—usually a sheet of paper having a circular grease spot in the centre—know as the "Bunsen disc," and suitably mounted in a travelling carriage, or fixed, according to the type of photometer, and provided with suitably adjusted reflecting mirrors. By the aid of this disc, the operator can ascertain, on observing the position in which its two faces are equally illuminated, the relative values of the two lights. Thus,

* See JOURNAL, Vol. LVI., p. 1195. † *Ibid.*, Vol. LIX., p. 1057.

supposing this point is found to be 44·5 inches from the standard light, and 15·5 inches from the gas light, then the relative value of the latter to the former will be as $44{\cdot}5^2$ is to $15{\cdot}5^2$, or as 8·2 is to 1; and as *two* candlesticks are employed, the illuminating power is therefore 16·4 candles. Means are provided for regulating and ascertaining the pressure of gas at the burner, for accurately adjusting the rate of burning of the gas, for ascertaining the rate of consumption of sperm, and for making such calculations as may be necessary to compensate for irregularities which are too insignificant to invalidate the test.

Of proposed standards of light other than the (at present) only legal one of sperm candles, Harcourt's pentane air gas and the Methven screen are, perhaps, the most practical and promising. The former system embodies the employment of a mixture of air and pentane gas of constant specific gravity, in the proportions of 3 cubic feet of air and 9 cubic inches of pentane; the mixture being consumed from a ½-inch orifice, so as to produce a flame 2½ inches in height, and burning not less than 0·48, nor more than 0·52 cubic foot per hour, and giving an unvarying amount of light which accurately represents the average of one sperm candle. Later improvements provide for the employment of pure pentane only. The second system named allows for the gas under test being also used for purposes of comparison. This may appear paradoxical; but it is a fact that, within certain limits, the quantity of light emitted through a slit of given area, placed in a certain position in relation to the flame of the standard "London" Argand burner, is constant, notwithstanding variations in the illuminating power of the gas. The limit named may safely be put at between 15 and 20 candles; the gas burning under conditions named below. The arrangement designed by Mr. Methven therefore embodies the employment of the burner named in lieu of the two candles, and a vertical screen placed in a fixed position between the light and the Bunsen disc, having in it a slot "of such dimensions as to allow of the passage of as much light as equals that afforded by two average standard sperm candles when the Argand burner is delivering sufficient gas to give a flame 3 inches in height." The writer has found this arrangement reliable, and an exceedingly convenient substitute for candles; the light emitted being invariably that of the average of two of the best sperm candles. Later modifications include the admixture of pentane gas burnt in a flame 2½ inches long, which is said to give constant results whatever may be the illuminating power of the gas under test.

There are two principal forms of photometer in use in England—viz., the Evans open or closed, in which the disc employed is fixed at a stated distance from the gas light—provision being made for the candles to travel to or from the disc in accordance with the observed illuminating power of the gas; and the "improved Letheby" open photometer, in which both gas and standard lights are fixed at a distance of 5 feet from each other, and the disc travels between them. A graduated bar is an adjunct to both types of photometer; and by its aid the operator can at a glance ascertain the indicated illuminating power, according to the position of the disc in relation to the two lights, without the necessity for making any calculations.

The Austro-Hungarian Gas Industrial Society.—The annual meeting of this Society took place at Pressburg, Hungary, on the 12th and 13th ult., under the presidency of Herr Carl Bauer. Unfortunately, the meeting was not very well attended; but several interesting communications were read. Herr Bauer was re-elected President; and Trieste was decided upon as the place of next year's meeting.

The Incorporated Association of Municipal and County Engineers.—The members of this Association residing in the eastern counties district will have a meeting at Bury St. Edmunds next Saturday. They will be received by the Mayor (Mr. E. W. Lake) in the Town Hall. Four papers will be read—one on "Water-Meters for Municipal Purposes," by Mr. D. Godfrey, of Droitwich; and another on "Sanitary Work in Bury St. Edmunds," by Mr. J. Campbell Smith, the Borough Surveyor. After the business, the Mayor will entertain the members at luncheon; and subsequently visits will be paid to the sewage works and places of interest in the town.

The Production of Manufactured Iron in the United Kingdom.—Some particulars given in *Engineering* show that the production of puddled bar iron in the United Kingdom in 1892 was 173,205 tons less than in the previous year—a decrease equal to about 10 per cent.; the total having been 1,560,697 tons, instead of 1,733,902 tons as in the previous year. South Staffordshire and Worcestershire make about one-third of the total; yet their output is fairly well maintained—the reduction being only about 5 per cent., while Cleveland, the next largest producing centre, has a decline equal to 32 per cent., due undoubtedly to labour difficulties. Scotland comes next with 216,510 tons—practically the same as in the preceding year; but this is far below the average of some years of prosperity. Lancashire, with a total of 214,084 tons, has increased her output fractionally; the only other increase being one of nearly 25 per cent. by Shropshire, which last year turned out 41,828 tons. North Staffordshire made 158,826 tons—showing a decrease of 6·8 per cent.; and Yorkshire, 130,662 tons, a decrease of 8·4 per cent. The other districts have lessened their make in even greater ratios.

TECHNICAL RECORD.

THE SOCIETY OF ENGINEERS AT RAMSGATE.

The members of the Society of Engineers, to the number of about 60, paid a visit to Ramsgate last Wednesday; and the opportunity was taken full advantage of by the President—Mr. W. A. Valon, J.P.—for making a systematic exhibition of the engineering works with which he is connected, and which have for their object the service of the town with the two necessaries of life, gas and water, and its improvement as a pleasure and health resort. It may be put on record at once that the organization of the trip by Mr. G. A. Pryce Cuxson, the Secretary of the Society, and his local assistants for the occasion (mostly members of Mr. Valon's staff) was perfect; all the items of a long day's programme being punctually and satisfactorily carried out without the slightest hitch or apparent trouble. The success of the day as an outing was largely due to the favourable weather; but this condition seems to have been so much a matter of course during the remarkable season which we are actually enjoying, that it almost escapes notice.

The party was conveyed from London to Ramsgate by special train on the London, Chatham, and Dover line, and was received on arrival by the Mayor (Alderman W. P. Blackburn) and members and officers of the Corporation; and, having been conveyed in breaks to the water-tower, the visitors were there entertained at luncheon. This tower is a conspicuous feature of the landscape on the shore side of the town, and was erected according to the plans of the late Mr. W. E. Stevenson and Mr. Valon for affording a constant supply of water to the town, and thus assuring to the residents, fixed and temporary, that first essential to the health of a summer resort. The supply is pumped from a well in the chalk at Whitehall, a distance of about two miles from the town; and the water is aërated as well as stored in the high-level tank, whence there is an overflow in direct communication with the low-level reservoir. This arrangement obviates the necessity for making any alterations of valves during pumping hours.

From the water-tower a move was made to the gas-works, which were thoroughly inspected. The manufacturing station is situated in Hardres Street, in the midst of lodging-houses, and is therefore surrounded by a dense population of a character peculiarly sensitive on the score of nuisance. Gas-making has consequently to be conducted in the most careful manner; and it speaks eloquently for Mr. Valon's management that visitors to Ramsgate make no more sign of knowledge of the fact that the gas-works are in their midst than if these were miles away. The present capacity of the works is about 200 million cubic feet per annum; and the site is very restricted. The retort-house contains fourteen beds of sixes, and five beds of eights, all fired by simple regenerative furnaces, and stoked by the aid of West's manual machinery, which for works of this size has not been surpassed. As readers of the JOURNAL are aware, Ramsgate was the pioneer works for using oxygen as a help in gas purification; and much curiosity was displayed by Mr. Valon's visitors last week in regard to the plant employed in this process. It is unnecessary, however, to describe this plant here. Suffice it to say that it works as well as ever; and that the technical results of the purification leave nothing to be desired.

The remainder of the day was devoted to an inspection of the new sea-front and harbour improvement works, which were commenced early last year after Mr. Valon's plan, and are being satisfactorily carried out by the contractors, Messrs. W. and T. Denne, whose proceedings in the matter are very well spoken of by the local authorities. It hardly comes within our province to describe these constructions, which are purely civil engineering, beyond acknowledging that improved Ramsgate will probably grow faster than ever, and consequently make further demands upon the gas-works, which already can hardly be enlarged fast enough to cope with the consumption, fostered as the business has been by Mr. Valon's popularizing policy. Ramsgate ought certainly to have looked to its sea-front a generation ago; and the town would then, in all probability, have retained the vogue which it once enjoyed as the favourite watering-place for Londoners on the South-eastern coast. As it is, the town has been content to be approached from the most frequented railway station, and from the harbour, through a coal-yard, which circumstance, with the absence of direct communication between the east and west cliffs, has stamped the place as lacking in enterprise. This reproach is now in a fair way of being removed, thanks to the ingenuity with which Mr. Valon has dealt with the many difficulties, personal and topographical, that always bar the road of town improvement, and nowhere more threateningly than where, as at Ramsgate, improvement is most urgently and most obviously required.

The visit terminated with a dinner at the Royal Hotel, at which Mr. Valon presided, supported by the Mayor, the Chairman of the Improvement Committee (Captain Hammond, J.P.), and the Chairman of the Gas and Water Committee (Mr. C. J. Gwyn), all of whom testified to the energy, tact, and skill of the President in discharging the multifarious and onerous duties of his position in the now awakening and progressive town.

REGISTER OF PATENTS.

Coke Screening and Sorting Machine.—Pye, T. E., of Shrewsbury. No. 10,157; May 27, 1892.

This invention (designed chiefly for screening or grading breeze or coke) consists essentially in applying to a sieve, suspended by adjustable rods or links, a number of interchangeable cams on a rapidly rotating shaft below the lower end of the sieve—comprising cams of varying throw acting vertically, and cams of triangular formation acting laterally, so as to give the desired composite motion.

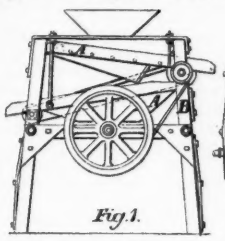


Fig. 1.

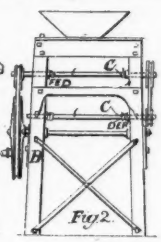


Fig. 2.

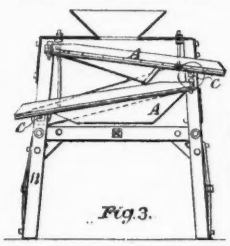


Fig. 3.

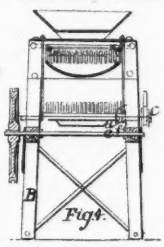


Fig. 4.

The screens A are mounted in a braced wood frame B, freely suspended by rods and links. Beneath the lower end of each of the screens is a shaft or spindle C, rotating rapidly in bearings. On each spindle is securely fixed a number of cams, D, E, F; two sets being preferably employed, one at each end of the shaft. Two of the cams are of similar shape, with a radial lift or throw; but preferably of different height, to vary the movement. The third cam F is of such a shape as to give both a lifting and lateral movement; being triangular in section, the base parallel with the spindle, and the hypotenuse rising at an angle of 45° therefrom. The first two sets of cams are placed on the shaft, with the lift of one in a different position to that of the others; and the third cams are placed one on the end of the shaft (in a position not coincident with that of the others), so that the inclined face strikes against the side of the screen, and gives it at the same time both a lateral and a lifting movement. The cam F on one side is also set reverse to that on the other, so that they come into action alternately, and throw the sieve first to one side and then to the other, at the same time inclining it sidewise. The screen is preferably suspended clear of the shaft, so that no weight rests upon it, except when the cams strike the sieve.

By this arrangement of cams, the sieves receive the desired vibratory motion; and vertical and longitudinal movements are imparted by the cams D and E. As they strike the sieve, they lift it vertically; and at the same time they carry it longitudinally towards the upper support. The lateral and tilting movements are imparted by the cams F. As they alternately strike it, they throw it from side to side, and lift first one side and then the other.

Carburetting Apparatus for Gas or Air.—Marcus, S., and Bothe, E. F., of Vienna. No. 11,809; June 24, 1892.

This invention in gas and in carburetting apparatus consists in improvements in the three main parts that are common to most similar appliances; the claims of the patentees being: (1) The combination of a number of annular vessels filled with capillary substances; the central free space of such vessels being filled with water, for partially substituting the warmth withdrawn from the carburetting fluid by evaporation. (2) The arrangement of a steam-blower, consisting of an injector in combination with a condenser, arranged within the carburetting apparatus, for the purpose of freeing the air-current from water, as far as possible, and utilizing the warmth set free when the steam is condensing in the apparatus. (3) An arrangement of regulating device, consisting of a cock operated by a bellows and easily moved, and mounted in the service-tube for air or gas, for the purpose of automatically increasing or decreasing the free passage for such fluids, according to the movement of the bellows caused by the varying differences of pressure. (4) The further arrangement of a bellows' blower, consisting of a number of bellows alternately, and within regular intervals, delivering the current of air to a common channel, by which the air is led to the regulating-device and carburetting apparatus.

Manufacture of Gas.—Lake, H. H.; communicated from W. H. Harris, of Boston, U.S.A. No. 12,441; July 5, 1892.

This invention relates to a process for making gas with a modified form of the apparatus described in United States patents No. 391,111 and No. 463,965, both dated 1891. The object is "to generate gas from bituminous coal, mixed with cannel coal or with other hydrocarbon—steam and air being supplied thereto, by which the various gases are generated at different points, and mixed together by a continuous process in one direction, and in an apparatus employing a single generator and regenerating chamber." Another object of the invention is "to utilize the waste heat in the generating-chamber."

The illustrations show the old form of cupola furnace, with tuyeres for supplying air to support combustion. The primary combustion-chamber is arranged with an enlarged generating and gas-mixing chamber above it; an uptake or flue communicating directly with the regenerating or gas-fixing chamber. The regenerative chamber is composed of five passages of serpentine form, filled with balls made of silicate of alumina, or other substance capable of absorbing a large amount of heat without deterioration. The steam-pipe tapping the generating-chamber is at the termination of the superheating-coil; but the patentee has found from experience that superheated steam is not essential in the process, as the heat of the generating-chamber is sufficient to decompose dry steam, though it is more economical to superheat the steam.

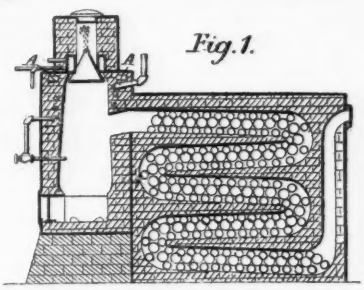


Fig. 1.

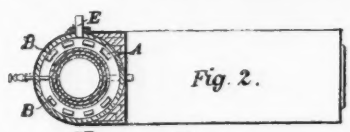


Fig. 2.

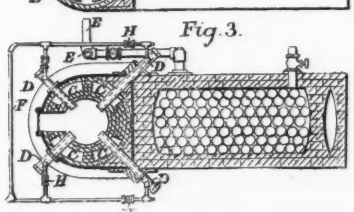


Fig. 3.

In order to more thoroughly utilize the heat (and this is where the new "invention" comes in), the patentee proposes to make an annular chamber A at or near the bell, into which the air is forced for supporting combustion, with a series of hollow tubes B, connecting the chamber A with the series of chambers C, through which the tuyere-pipes D pass. These are provided with openings for the entrance of air to the interior of the tuyeres. E represents an air-supply pipe, which leads to the fan or blowing engine, and by means of which air is forced into the annular chamber A, passes down the vertical tubes B into the segmental chamber C, and thence into the tuyere-pipes, for supplying air to the base of the charge within the primary combustion-chamber. A high and continuous heat is required in the fixing or regenerating chamber; and a small amount of steam supplied to the tuyeres, and mixed with the air, may be employed to provide a blast that promotes combustion and raises the heat higher in the generating-chamber. F are steam-pipes tapping the tuyere-pipes D; and H are valves for controlling the amount of steam admitted thereto. This steam may be taken from the superheating-coil or from a boiler, as preferred.

The mode of operation is as follows: Soft or bituminous coal is introduced into the primary combustion chamber through the feeding-shaft, the bell of which is lowered to admit the charge, and immediately raised to seal it again. The coal to be burned lies in the primary combustion chamber; and, on being ignited, the heat and volatile products of combustion pass directly through the uptake, and thence through the regenerating chamber. Steam is admitted by the pipes F, as soon as the charge in the generator is of sufficient heat to break up the steam; but no more steam is admitted than the combustion will take up, so as to actively maintain a high degree of heat. When the balls at the terminal of the regenerating chamber are raised to 1000° or 1200° Fahr., the apparatus is hot enough to commence making fixed gas continuously; and steam is then admitted into the gas-generating chamber.

In practice it is found that a generator 3 feet in diameter will take all the steam which can be supplied by a 1-inch pipe, and convert it into a combustible gas. The gas-mixing chamber is highly heated; there being a considerable draught furnished thereto by the ascending current of the heated products of generation. The steam, too, cutting the same at right angles produces a cyclonic effect; so that there is a rapid whirling of the gas, thereby bringing it into condition for forming a fixed gas in the regenerator chamber. The gases thus generated pass rapidly into the regenerating chamber, and (being at a higher heat) do not cool down this chamber and material, but impart heat thereto, if driven to their fullest capacity.

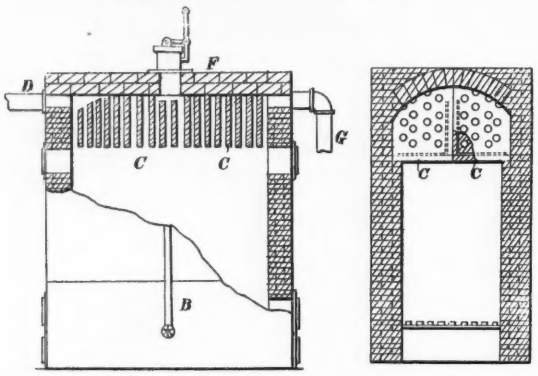
The patentee says that he has found from experience that the best Youghiogheny coal, when burned under the conditions stated, with the full amount of steam which it will take, is scarcely high enough for a good fuel gas. He enriches the gas for illuminating purposes, however, by adding hydrocarbon product; and this may be done in various ways—oil, benzene, or similar hydrocarbon liquids, being introduced through a pipe into the upper part of the gas-generator. In lieu of this, however, cannel coal may be mixed with the bituminous coal or other hydrocarbons—such as pitch, rosin, or bye-products of petroleum—and introduced with it into the charge. If an illuminating gas is desired, the hydrocarbon added should be sufficient to furnish from 1 to 3 per cent. of benzol vapour; and this will make rich illuminating gas. For this purpose, it is preferred to employ about one-half by weight of benzene to the coal fed to the regenerator.

It is claimed that a material advantage is obtained in heating the air by introducing it at the top of the generator-shaft, and passing it down through the tubes enclosed within the brickwork, which take up

the waste heat, and thereby the air is admitted to the furnace hot. This promotes rapid combustion, and assists in keeping the regenerating chamber hot as well as quickly bringing the gases to a uniform degree of heat, so that they will mix easily and form a fixed gas.

Manufacture of Carburetted Water Gas.—Askins, J., of Lima, Ohio, U.S.A. No. 2716; Feb. 7, 1893.

This invention consists in a process of carburetting water gas, by bringing hydrocarbon vapours and water gas from different directions, and causing them to mingle in divided currents in contact with highly-heated surfaces. It also consists in the combination with a water-gas generator, adapted to receive hot hydrocarbon vapours or gases from any convenient source, of a body of perforated tiles or checker-brick-work, supported in the upper part of the water-gas generator, and forming therein a perforated fixing surface. The hydrocarbon vapours and gases are introduced through this from the outside, and are passed horizontally in contact with the ascending currents of water gas in the generator, so that the mixture of gases is fixed by contact with the heated surfaces of the tiles or checker-work.



The water-gas generator has a suitable grate for supporting a coke fire, to which steam is admitted through a pipe B, as usual. C is a structure of spaced-apart tiles or refractory checker-brickwork, supported in the upper part of the water-gas generator; and D is a pipe leading into the generator opposite one end of the checker-work. This pipe is arranged as an inlet for hot hydrocarbon gases or vapours from any suitable or convenient source. The tiles may be about 3 inches thick, built into the walls of the generator, as shown; the opposite individual tiles or tile sections being arranged to meet centrally. The tiles, which may be spaced apart at intervals of about 3 inches, are provided with perforations to permit the horizontal passage of gases. The tiles or checker-work become intensely heated by proximity to the bed of incandescent fuel in the generator; and the currents of water gas ascending from the fuel into the vertical spaces between the heated tiles, are thereby brought into immediate contact with the currents of hot hydrocarbon gas or vapour admitted through the pipe D, and pass horizontally through the tiles or checker-work. The water gas and hydrocarbon vapours are thus thoroughly commingled; and, "under the influence of intense heat, the various elements are re-combined to form a fixed gas, suitable for use as a fuel or for illuminating purposes."

To permit the wholly unobstructed entrance of hot hydrocarbon vapours through the pipe D into the water-gas generator, the tiles may be cut away opposite the end of the pipe. They may be also cut away below an outlet F, arranged in the top of the generator. This outlet is provided with a valve for use in the preliminary heating of the apparatus, preparatory to the making of water gas. To carry off the fixed carburetted water gas produced in the apparatus, the valve being then closed, a gas-outlet G is provided, which may lead to a scrubber, a gasholder, or directly to the place of consumption.

In operating the apparatus, the draughts of the water-gas generator are opened while the generator and the tiles C in its upper part are being heated, after which the valve is shut down. When the coke fuel in the generator has become incandescent, steam is admitted to the generator through the pipe B; and hot hydrocarbon vapours and gases are then allowed to pass through D into the upper part of the generator, in contact with the intensely-heated tiles or brickwork C, through which the vapours and gases pass in a horizontal direction. While thus passing horizontally through the tiles or brickwork, the hot hydrocarbon vapours are mingled with the ascending water gas as generated; and by contact with the intensely-heated tiles, the gases become fixed before passing off through the pipe G.

Gas-Engines.—Evans, E. W., of Philadelphia, U.S.A. No. 2788; Feb. 8, 1893.

This invention has reference generally to engines—particularly to the class known as "gas-engines for power purposes;" and it has special reference to the construction and operation of a rotary or balance valve that combines the principles of mixing, condensing, ignition, and exhausting.

The claims for the invention are: (1) In a gas-engine, the combination, with the piston cylinder, piston, and its connected power-transmitting gearing, of a balance-valve consisting of a fixed body portion, having a combined supply and mixing port, a combined exhaust and outlet port, and combined port communication with the piston cylinder, and two moveable portions—one on each side of the fixed portion—mounted on a shaft extending through the latter, and rotating therewith; each of the moveable portions being provided with a pocket adapted to communicate with their respective ports in the fixed portion, at predetermined intervals. (2) Special means for timely exploding a charge of gas in the engine, whereby the charge may be taken into the engine, and in turn compressed, exploded, and exhausted.

Charging and Drawing Retorts.—West, J., of Manchester. No. 5806; March 17, 1893.

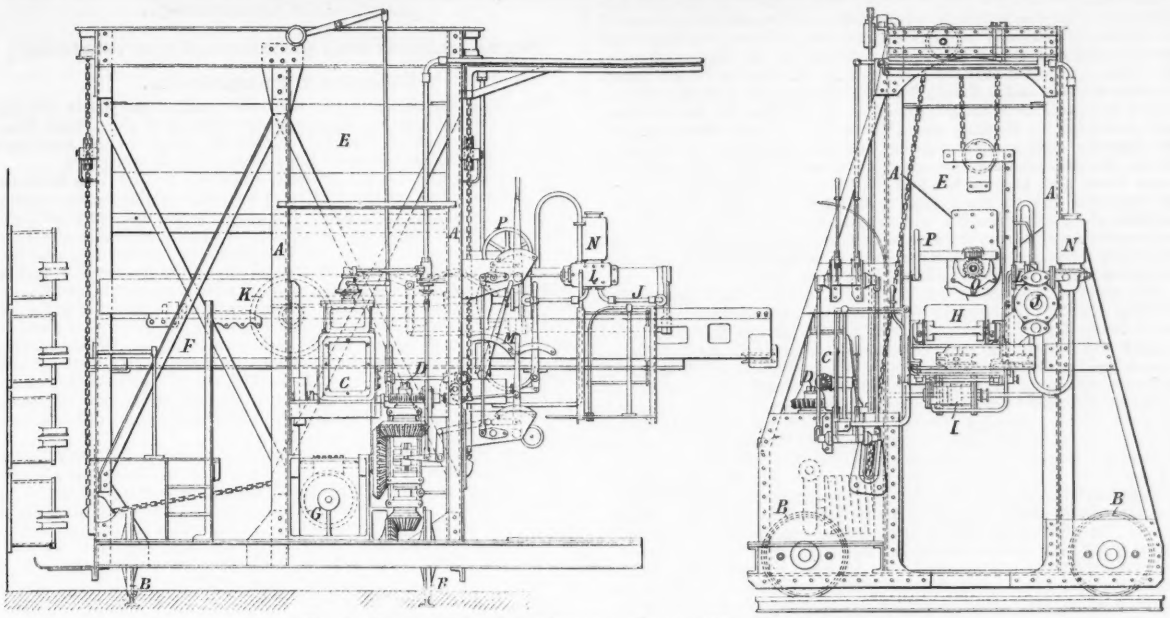
This machinery is designed as an improvement on that described in the patentee's former specifications—No. 789 of 1881; No. 1226 of 1886; and No. 723 of 1888. Its principal objects are: "To distribute the coal from the charger more evenly and more to the sides of the retort than when the retort is charged by allowing the scoop to enter the retort both times in the same course; to provide means whereby the speed of the drawing-rake is effectually controlled, and gradually but surely brought to rest at the end of the drawing stroke; and to provide means whereby the drawing-rake and charging-scoop can be manipulated more economically than hitherto." It consists essentially: In causing the charging-scoop to move a small distance sideways after the coal from the first half of the charge has been delivered into the retort, and, before the scoop goes in a second time, to complete the charge, by means of a cylinder, with piston and rods so fixed on the charger-frame, and working between the main framework of the machine that a sideways movement of the charger can be obtained by directing compressed air to one or the other side of the piston; in causing the motor piston of the drawing-machine to operate a plunger or piston, working in a cylinder containing water free to escape into a reservoir through an adjustable orifice, which is gradually closed at the end of the drawing stroke, so to prevent any damage to the rake at the end of its outstroke; and in providing an arrangement whereby, before the motion of the motor piston is reversed, the pressure on the two sides of the piston is equalized, so that a certain amount of air is saved.

The drawing-machine, as shown in the engraving, consists of an upright frame, supported on four wheels A, which run on rails in front of the retort-stack; being propelled by the hand-wheel B, acting through the bevel-gearing C and D. The channel-iron hanging-frame E, in which the rake-bar runs, can be hoisted to suit the various heights of the retorts, by means of a small winch, worked by the hand-wheel G, and acting upon the hoist-chain H. The chain passes over pulleys I on the top of the frame; and it is attached to the sliding brackets J supporting the frame E. The rake K is propelled into, or withdrawn from the retort by means of the bar L, guided in a straight line by the channel-guides E. The rake can be kept out of the coke, or depressed into it at will, by means of the rocking-lever M, acting through the vertical rod N, and causing the frame E to rock round a pivot at O. The power for drawing the coke and working the rake is transmitted from the cylinder P through a piston-rod, the rack R, pinions S, chain-drum T, and chains U and V. The latter are fixed to the drum in such a manner that, when it is caused to rotate, the one chain is wound on to it, while the other unwinds or pays out. The drum is made in two parts, so that, when the chains become slack from any cause (such as hoisting from one tier to the next), they can both be tightened up. The tank W is filled with water, for the purpose of cooling the rake K, through flexible hose X and a spray-pipe Y.

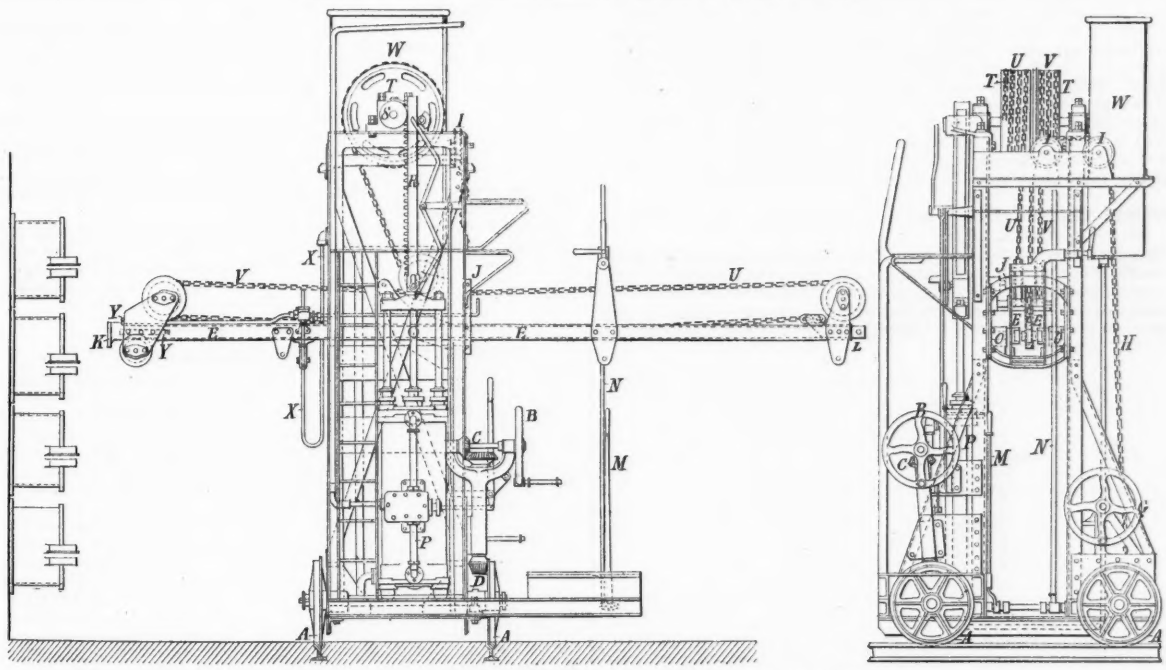
Up to this point, the apparatus is substantially the same as that described in the 1881 and 1886 patents; the construction and mechanism of those parts which are new being as follows: The cylinder P is provided with a piston Z and a rod carrying a crosshead near the top, and cottered to the rack R above the crosshead. At each end of the crosshead, a plunger is attached, by a nut above and a shoulder below, so that, when the crosshead is moved, the plungers must move with it. For a short distance near the bottom end of each plunger, there is a taper groove made in it. The plungers do not fit the side cylinders, except for a short distance near the bottom. The bottom of each cylinder is connected to the other by means of a pipe; and each cylinder has an outlet in the side at a short distance from the bottom. This is of oblong shape, and opens into a passage which is kept full of water by pipes leading into the bottom of the tank W. Compressed air is supplied to the valve-box; and a slide-valve distributes the air, as described hereafter. When it is desired to send the rake-head into the retort, the hand-lever provided for the purpose is pulled in the necessary direction; and air is thereby admitted to the underside of the piston Z. As the piston moves upwards, it causes the chain-drum T to revolve through the operation of the rack R and pinion S; and the chain V is thus wound on the drum, drawing the rake-bar L forward, and causing the rake K to enter the retort. While this operation is going on, the two plungers are lifted by the crosshead; and water flows out of the tank into the cylinders, following up the plungers until they reach the top of their stroke. The speed of the rake is kept moderately constant, in the first place, by the continually increasing leverage at which the weight of the rake-bar acts; and, in the second place, by the action of the exhaust air from the space above the piston—it being allowed to escape only at a certain rate, by adjusting the area of the exhaust orifice. If an obstruction to the inward motion of the rake should be met with, the air above the piston will have time to escape through the exhaust orifice; and a greater effective load will thus come upon the piston-rod until the resistance is overcome.

To draw the coke from the retort, the rake-bar is depressed into it by the lever M; and then the necessary lever is moved until air is admitted above the piston, and that below allowed to exhaust. The chain U is thus wound on the drum T, and V uncoils; and the motion goes on at a predetermined speed until the plungers reach a point near the bottom of the cylinders, when they gradually cover up and partially close the outlets, so that water can only get out very slowly. As great resistance is thereby produced, the motion of the plungers is gradually arrested, and the whole of the moving parts are brought quietly to rest.

The arrangement of mechanism whereby the compressed air is allowed to pass from one side of the piston to the other, is as follows: The valve-box has three ports, so placed that one is connected with the cylinder P below the piston; another is connected with the cylinder above the piston; and the third is in communication with the atmosphere, and forms the exhaust-port. A slide-valve is used, to distribute the compressed air from the valve-box to either end of the cylinder, as desired; but the slide-valve is not of the ordinary kind, because it has a passage formed in it in such a way that, when the valve is placed in a central position, the compressed air in either of the spaces can flow through the passage until the pressure is equal, and without communicating with the compressed air in



WEST'S RETORT-CHARGING MACHINE—PATENT NO. 5806 OF 1893.



WEST'S RETORT-DRAWING MACHINE—PATENT NO. 5806 OF 1893.

the valve-box or with the exhaust. When the second-named port is open to pressure, the first port is in communication with the exhaust; and, when the first port is open to pressure, the second is in communication with the exhaust. During the operation of reversing the action of the machine, the valve in its motion first shuts the supply-port, whichever it may be, closing the connection of the other port with the exhaust at the same time. Then, by the continued motion of the valve, the second port becomes connected with the first through a passage; and air flows from one side of the piston to the other until equilibrium is attained. By the still further continued motion of the valve, the communication between the ports is cut off; and then one or other port may be opened to the pressure, while the other is opened to exhaust. Thus the reversal takes place in every instance after communication has been made between the two sides of the piston; and a saving is effected in the manner previously described. There are two tappet-levers, communicating through connecting-rods with the actuating lever, whereby the valve is placed automatically in its central position when the piston approaches either end of its stroke.

The charging-machine (as shown) consists of an upright rectangular frame A, supported on four wheels B, which run on rails in front of the retort-stack; being propelled by means of the motor C driving the vertical shaft D, having a sliding-clutch, which, when put in gear with a pinion, turns the wheel axle, so that the machine is made to travel along the rails. The motor is made to reverse, to cause the machine to travel to the right or left, as required. The motor is used for raising or lowering the coal-hopper E and charger-frame F, by putting the sliding-clutch into gear with the bevel-wheels, shown as driving a chain-barrel G, on which hoisting-chains are caused to wind on or off according to the direction the motor is running. The chains lead over the pulleys shown; and are anchored to the top of the main frame by fastenings. The hopper and charger-frame are suspended freely from the chain-pulleys; and there are sufficient spaces between the sides of the hopper and charger-frame and the uprights of the main frame to permit the sideways movement of the frame and charger H. At bottom of the charger-frame, a cylinder is fixed; this cylinder having a piston I, working through stuffing-boxes and glands in covers. The piston-rods are arranged to slide up or down between the uprights of the main frame of the machine, when the hopper and charger-frame are raised or lowered. A valve-box, having an ordinary three-ported slide-valve, is so fitted to the cylinder that the slide-valve will admit the pressure air to one side of the piston, while that on the other side is exhausted into the atmosphere. Compressed air is supplied to the valve-box and cylinder by a pipe, the valve of which is controlled by a hand-lever.

On the charger-frame is fixed an air cylinder J, having two water-check cylinders. This cylinder is fitted with a piston and rod having a cross-head fitted at one end with two piston-rods, having pistons working in check cylinders. A rack is also fitted at the end of the piston-rod, driving a pinion connected to a chain-drum K, having chains attached to it, leading over pulleys to the charger, and anchored to the chain-barrel on the charger. The charger used is the same in detail and working as that in the 1886 patent.

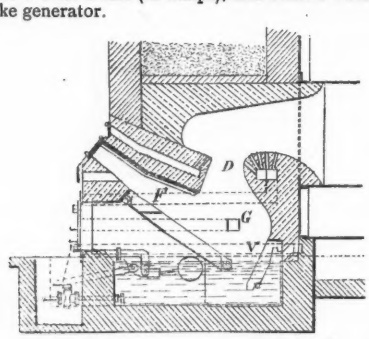
On the air-cylinder J is fixed a box L, fitted with a slide-valve similar to that described for the drawing-machine; the ports leading to each end of the cylinder, and effecting the same object of economy in compressed air used. The valve for the air-cylinder is controlled by the hand-lever M, fitted to the side of the charger-frame. When the piston has nearly made a full stroke, the tappet on the crosshead comes in contact with a tappet-lever; and, in the way described for the drawing-machine the air is shut off. A reverse stroke is then made; and, when near its completion, the tappet-lever will again shut the air off.

The method of controlling the speed of the piston is by water displacement; the check cylinders being filled with water from the vessel N, which automatically supplies water to the cylinders as they make an outstroke, and stores the water delivered by the displacement of the piston-rods when they enter the cylinder during the return stroke. In order that the water should follow the pistons freely on the suction-stroke, two suction-valves are provided, in addition to the two inlet and outlet ports; so that, when the water is being forced out on the pressure stroke from one end of the cylinders, the pressure closes the suction-valve communicating with that end, and the water from that end of the cylinders is only permitted to pass to the opposite end of the cylinders through the ports—though the suction-valve communicating with the suction side is free to open, so as to permit water from the water-vessel N to follow the piston freely. The ports are provided with taper-pointed adjusting screws, for regulating the size of the ports and speed of water flow.

The cycle of operations for charging a retort is as follows: The machine having been brought opposite a retort, and the charger adjusted to the desired position for making the charge, the coal is fed to the scoop from the hopper through the feeder-box O, by turning the hand-wheel P. As soon as the scoop is full, the hand-lever M is moved in the proper direction for causing the compressed air to enter the end of the cylinder; inducing the rack to go forward and operate upon the rack pinion, thereby turning the chain-drum K, and winding up one chain and unwinding the other, so as to drive the scoop into the retort. As soon as the charger approaches the end of its out-stroke, the tappet on the crosshead comes in contact with the tappet-lever, and causes the air supply to be cut off, preventing any further motion. The lever M is then reversed. Air is thus admitted to the opposite side of the piston; and the return stroke is made—the scoop being turned through a certain angle for depositing the coal in the retort, as described in the 1886 patent. The charger, when withdrawn from the retort, comes to rest in the charger-frame, ready for the second supply of coal, which is provided by again turning the hand-wheel P, as described above. But before the scoop is sent forward into the retort this time, the hand-lever is moved to admit air to one side of the piston I, causing one of the piston-rods to press against the sides of the main frame. The cylinder attached to the charger-frame is thus moved sideways, carrying with it the charger-frame F and the charger, which are swung through a small angle round the centre of the chain-pulleys. The charger-scoop is then propelled into the retort; and the coal is deposited as described for the first portion of the charge. As soon as the charger is again at rest in its frame, the hand-lever is moved over, so that air is admitted to the opposite side of the piston I; and the charger-frame F is then brought back to its original position. The machine is then propelled to the next retort.

Combined Gas and Coke Furnace.—Schomburg, H., of Berlin. No. 7002; April 5, 1893.

This invention relates to a gas and coke furnace, which may either be combined or not with apparatus for regulating the air supply, such as is described in patent No. 9085 of 1892. It consists of a gas-retort, constructed of masonry or moulded, provided with an inclined grate, adapted to receive solid fuel (in lumps), and behind which is arranged a gas and coke generator.



F is the gas-retort, or a retort-shaped furnace for solid fuel, in which the coal is spread on an inclined grate, over which extends an arch of about equal length. These parts being arranged at about the angle and distance apart indicated, the coal is freed from gas "at the highest speed," and is in part consumed on the spot; while the remaining part passes in the condition of coke into the gas-generator G, arranged behind the grate. This is of peculiar construction; being widened in one part to twice the size of the grate or more, and narrowed down to half or one-quarter of its size at the discharge orifice, and provided with a slag or under grate. Upon being here converted into carbonic oxide, it burns without any smoke, at V and D, with the assistance of a secondary supply of air, and at an increased temperature—the maximum useful effect being obtained.

The ends of the grates of both furnaces are immersed in a water-tank, provided in the ash-box; and, as the water-level rises or sinks, the grate-surfaces in operation, in accordance with the 1892 patent, are reduced or enlarged.

According to the nature of the fuel or the size of the furnace, the grates may be mainly formed of fire-brick or iron; or they may be entirely dispensed with. The grates situated in the rear chamber, constituting the generator, may also be of any suitable shape and size.

APPLICATIONS FOR LETTERS PATENT.

10,171.—PETTIGREW, G., "Distillation of ammoniacal liquor and other fluids, and manufacture of sulphate of ammonia." May 23.

10,190.—LEE, J., and LANCASTER, S., "Producing an atmospheric or Bunsen smokeless flame from liquid hydrocarbons as fuel." May 23.

10,223.—BOULT, A. J., "Gas pressure-regulators." A communication from F. Stahlschmidt. May 23.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by our correspondents.]

Federation v. Re-organization.

SIR,—Gas engineers cannot read the various proposals for the federation of all the Gas Managers' Associations of the United Kingdom, without turning over in their minds what are the conditions under which the various assemblies of gas officials take place.

In the first place, we have what is known as The Gas Institute. This incorporated society admits as members engineers, secretaries, auditors, or any person connected directly or indirectly with gas matters. The Incorporated Institution of Gas Engineers is composed (or it should be) purely of gas engineers and their assistants. We also have various District Associations, all doing good work to a certain extent, but which do not discriminate on what the duties of its members are when at home. These numerous societies rightly demand attention of *all* persons directly interested in our great industry; and to attempt to disband any of them would be a mistake. Whatever may be the thoughts of certain sections of gas engineers, what is most required by the gas industry of Great Britain is re-organization of the various societies, and not federation. Such a course would provide for the desirable results which possibly might be obtained by any federation scheme.

The writer's suggestion is this—to divide Great Britain and Ireland into suitable districts, each having its own Association and management; and meet (say) half yearly for the transaction of business, as at the present time. A Central Council should be appointed annually to make all necessary arrangements for an annual moveable conference, to be held at a stated time. The Council should consist of an equal number of representatives from each District Association. With regard to the class of members, they might be divided as follows: Ordinary members to be gas engineers and managers, and gas chemists. Associates to be assistant gas engineers. Extra-ordinary members to be secretaries, constructing gas engineers, and persons employed generally in gas matters.

It should not be allowable for the Council of this proposed Institution to enter into any scheme for holding gas exhibitions, or promoting any competitions, or offering prizes which might tend to introduce rivalry or any other undesirable element, to the detriment of the gas industry.

Now as to the advantages which would be gained by this new order of things. The gas industry would then have an official representative body of men, such as we find representing the various industries of our Empire. Why should such an important profession as gas engineering suffer by the stigma cast upon it, that gas engineers, secretaries, and gas plant manufacturers cannot agree?

We all know the advantages of union; and by such a re-arrangement of trifling matters, money might be saved which could well be devoted to experimental purposes, to the material advantage of our industry.

A MEMBER OF THE NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

June 2, 1893.

New Method of Charging for the Consumption of Gas.

SIR,—I read in the JOURNAL a week or two since a paragraph in reference to what appeared to me to be a novel and, so far as I know, an unprecedented method of charging for the consumption of gas; but, it being a matter of price, I did not think it expedient to reply to it at the time. Since then, however, it appearing to me that some other company, on reading the paragraph, might be induced to adopt the same method, it will be better to say a few words on the subject.

The system, so far as I can understand it, seems to be this: Any consumer using more gas in any one quarter next year than he has done in the corresponding quarter of this year, will be entitled to have that additional quantity supplied to him at 1s. per 1000 feet less for the next year than for the present. The system may be illustrated as follows: A consumer with a large family has every part of his house lighted with gas, and has a stove as well, and he consumes in a winter quarter (say) 20,000 cubic feet; but in the corresponding quarter of the next year, finding it necessary to be more economical, he reduces his consumption to (say) 15,000 cubic feet. Another consumer, having only himself, wife, and servant, consumes in the same way (say) 10,000 cubic feet; but before the corresponding quarter in the next year comes round again, he adopts a gas-stove, and thereby increases his consumption by 5000 cubic feet. Both then use the same quantity of gas; and thus, under the proposed arrangement, the first will be charged the full price for all he consumes, while the second will be charged the full price for the first 10,000 cubic feet he consumes, but 1s. per 1000 feet less for the quantity he uses in addition.

In the early days of gas lighting, many Acts were passed without any prices being named in them; and a number of companies, under the belief that the local authorities could give the necessary powers to open the streets, started in opposition to those already in the district, and supplied gas at all sorts of prices in the same streets. Now, however, that each company has a separate price, is limited to a certain district, and is to some extent protected in that district, it ought to be clearly understood that every consumer in the district living within certain distance of the company's mains can demand a supply of gas on the same terms as his neighbour. Any reduction in the price to one class of consumers, unless it is dependent upon quantity, necessitates a higher charge to the others; and in this case it may be that the lower rate is charged to the smallest consumer in lieu of the largest, which, even if the Act allowed it, would in itself be inequitable.

The readiest way of ascertaining the cost of making gas is to take the total quantity charged on the debtor side of the account with the total quantity of gas sold, and calculate the cost per 1000 cubic feet. If this were always done, it would be seen that, in many cases where large discounts are allowed, gas is often sold at less than the cost price, and that the profits are to a large extent dependent upon the products.

W. LIVESEY.

Gas Companies' Association, 76, Palace Chambers, Westminster, S.W., June 3, 1893.

Electric Cooking and Heating.

SIR,—Our friends the electricians have during the last two or three years, when pronouncing upon the merits of the electric light for indoor illumination, repeatedly reiterated that one of its chief characteristics was practical absence of heat, and that the domain for gas was not as an illuminating agent, but rather as fuel for cooking and heating purposes; and if we would only look on quietly while they seized the lighting business, we should in due time be amply rewarded by doing an increased business in selling a much larger quantity of gas for cooking and heating purposes. Now we hear with surprise, after such alluring promises, that electricity is to compete with gas for all purposes; and Mr. Fletcher has done well in drawing attention to the subject in the last number of the JOURNAL.

It appears to me that the following table, which shows the relative values of gas and electricity when used for heat or power, cannot be too well known by all those who are interested in the subject:—

	Heat.		Power.	
Energy-Converting Agent.	Theoretical Value in Heat Units. (1 lb. of Water Heated 1° Fahr.)	Cost per Million British Thermal Units.	Approximate Actual Quantity Required per Brake Horse Power.	Cost per Brake Horse Power.
Gas . . .	1 cubic ft. = 670 ..	40d. ..	25 cubic ft. ..	0·675d.
Electricity.	1 B.T.U. = 3438 ..	1300d. ..	1 B.T.U. ..	4·500d.

The prices taken in the above table are for gas at 2s. 3d. per 1000 cubic feet, and electricity at 4½d. per Board of Trade unit, which are probably below the average prices generally charged. But in our case we sell gas at this price, and it is sold in a few towns at less. Also, I believe, electricity is sold in one or two places at the low figure given. Hence the comparative prices may be taken as impartial. The quantity given as required per brake horse power is, no doubt, in each case, excessive, except for small powers.

Assuming the full theoretical heating values of both agents are attained, they stand, as regards cost, in the ratio of 4 : 130; which means that gas is over 30 times cheaper than electricity as an agent for the generation of heat. It will therefore be evident that gas can, after allowing a liberal margin for the relative duty obtainable by these two agents in practical use, easily hold its own against electricity, whether employed to produce heat for cooking or general heating purposes.

The comparison made by Mr. Fletcher giving the relative values in practice of these two agents is much too favourable towards electricity, as the deduction is based upon Mr. Dowsing's figures, given in his recent article in *Lightning*: "With electricity at 5d. per unit, it requires about 3½ ampères for ten minutes to boil a quart of water; the cost being one-third of a penny." This should be a pint, not a quart. As usual, it errs in understating the cost of electricity. Hence, if we accept Mr. Dowsing's figure as corrected, it means that about 3d. is the cost to boil one gallon of water; and the same work can be done just as readily by 4 cubic feet of ordinary coal gas, costing rather more than one-tenth of a penny. So much, then, for boiling water by transforming electric energy into heat; and I do not fancy manufacturers are at the present time making such large profits that they can afford to increase their cost for power seven or eight times by introducing or substituting electric motors for gas or steam engines.

It therefore only remains for those who are interested, and who have practical acquaintance with the use of gas for cooking, heating, or motive power, to make known the many advantages and economy attending its employment; also to point out that the enchanting promises often made by over-zealous electricians are illusory, and that they generally only exist in the fervid imagination of those whose zeal outruns their discretion, when they talk about central stations supplying electricity for heating and power purposes.

In conclusion, I would commend to our friends who so often prophesy the decline of the gas industry the words in Oliver Goldsmith's introduction to "An Inquiry into the Present State of Polite Learning": "It has been so long the practice to represent literature as declining, that every renewal of the complaint now comes with diminished influence. The public has been so often excited by a false alarm, that at present the nearer we approach the threatened period of decay, the more our security increases."

Gas-Works, Stafford, June 3, 1893. J. FERGUSON BELL.

Mr. Alderman Pollack and the Widnes Corporation Gas Undertaking.

SIR,—At the meeting of the Birmingham City Council on the 16th ult., Mr. Alderman Pollack, in replying to a question from Mr. Bowkett, who had quoted the Widnes Corporation as selling gas at 1s. 10d. per 1000 cubic feet to ordinary consumers, and at 1s. 8d. to large consumers, is reported to have made the following statement: "As to the price of gas, he [Mr. Alderman Pollack] happened to know that the Widnes Corporation charged 1s. extra per 1000 cubic feet to persons who lived outside its own boundary, who formed the greater number of the consumers. Further than that, Widnes made a loss on its gas-works in 1891." With regard to the last part of the foregoing remarks, I should like to observe that our annual statement for 1891 did show a debit balance of £292; but as we expended that year the sum of £2630 on the extension of purifying plant, exhausting machinery, and scrubbers, charging the same against the revenue account, a profit of £2338 on the ordinary year's working was converted into a loss, as stated. Of course, Mr. Alderman Pollack could not be expected to know this; but it occurs to my mind that, while he was looking up our debit balance of 1891, he might also have noted our credit balance of £2648 for 1892; and as this gentleman evidently takes an interest in our working results, I may add, for his information, that our profit on the year just completed is £2520.

My object, however, in writing this letter is to direct attention to the statement made by Mr. Alderman Pollack as to the selling price of gas in Widnes. It is quite true that we have some large consumers outside the immediate boundary of the borough who take perhaps 10 per cent. of our make; but the charge to these consumers has always been precisely the same as that to the consumers within the borough. The recent reduction made by the Corporation, which takes effect with the current quarter for the first time, is to consumers within the limits of the borough only; so that the difference now is that these consumers outside the borough are paying 2s. and 1s. 10d. per 1000 cubic feet, as against 1s. 10d. and 1s. 8d. per 1000 cubic feet, the price now being paid within the borough.

The village of Hale, which is situated about three miles beyond the borough boundary, and other small outlying districts, obtain a supply of gas from Widnes—the average extra charge being 9d. per 1000 cubic feet over the ordinary selling price; but the quantity sold at this higher rate of charge is less than 2 per cent. of our total consumption.

In conclusion, I should like to state, for the benefit of gentlemen—Aldermen or otherwise—"who happen to know" something about the Widnes gas undertaking, that the quantity of gas sold per meter last year, throughout the whole district of supply, was 127,845,600 cubic feet, and that the quantity used for public lighting was 8,554,400 cubic feet; making a total of 136,390,000 cubic feet. The amount of money received for gas was £12,902; being 1s. 10·7d. per 1000 cubic feet of gas distributed. This left a profit of £2520 on the last year's working; and the Widnes Corporation, thinking this more than sufficient, decided to reduce the price of gas, as already stated.

Gas and Water Works, Widnes, June 3, 1893. ISAAC CARR.

Ammonia Purification in Belfast.

SIR,—You have always shown so much interest in the Claus system of ammonia purification, that you will be glad to hear that important progress has at last been made, and that the members of The Gas Institute, at their approaching visit to Belfast, will see gas completely purified on the large scale by its own ammonia, without the use of lime or oxide. The delay which has attended the installation of the new process is, of course, a matter of great regret to all concerned, and certainly not least to Mr. James Stelfox, the Corporation Gas Engineer, who adopted the system after a satisfactory completion of the trial experiments made under the auspices of Mr. Charles Hunt at Birmingham.

The delay has been entirely due to engineering difficulties such as commonly beset the establishment of a new industry; and these, it is believed, have now been successfully and finally overcome—generally in the simplest possible manner. A full account of the past history and present working of the Belfast plant will shortly be in the hands of your readers; but it is for the present impossible to supply it in detail, as some further time is required for test experiments. Explanations and details will be furnished not only by Mr. Stelfox and by Mr. Percy Hoskins, the Chemist to the Belfast Corporation, but also by the officials of the Ammonia Gas Purifying and Alkali Company, Limited, who will be present at the Ormeau Street Gas-Works.

Charing Cross Hospital, June 3, 1893. C. W. HEATON.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week:—

Bills read the first time, and referred to the Examiners: Aberdeen Corporation Bill; Barnoldswick Local Board Bill; Bodmin Water Bill.

Bills read a second time and committed: Electric Lighting Provisional Orders Bills (Nos. 1, 3, 5, and 6); London County Council (General Powers) Bill; Gas Orders Confirmation Bills (Nos. 1 and 2).

Bill reported with amendments: Belfast Water Bill.

Bills referred to a Select Committee, consisting of the Duke of Richmond (Chairman), the Earl of Mar and Kellie, Earl Mayo, Lord Carysfort, and Lord Herries; to meet on Monday, June 5: Blackpool Improvement Bill; London County Council (General Powers) Bill; South Staffordshire Water Bill.

Bills read the third time and passed: Brighton and Hove Gas Bill; Pontypridd Local Board Gas Bill; Stirling Water Bill.

Petitions against the London County Council (General Powers) Bill were presented from the Corporations of London and West Ham, Conservators of the Thames and Lea, Middlesex and Surrey County Councils, South Metropolitan Gas Company, and East London and Grand Junction Water Companies.

HOUSE OF COMMONS.

Thursday, June 1.

LLANDRINDOD WELLS WATER SUPPLY.

Mr. F. EDWARDS moved an instruction to the Committee on the Water Provisional Orders Bill (No. 2) to separate the Llandrindod Wells Water Order from the others in the Bill. He said there were serious objections to that Order passing as it stood, He would not then repeat the objections he urged some time ago, because they would possibly have to be gone into at a later stage. Seeing that there were three Orders in one Bill, it followed that any successful objection to the Llandrindod Order would be fatal to the others; so he desired to distinguish that Order, and to discuss it on its merits.

Sir MICHAEL HICKS-BEACH said he was anxious to know the position of the Board of Trade with regard to the Bill. When the honourable gentleman objected on the second reading, the President of the Board of Trade very naturally and properly pointed out that the right time to object to a Provisional Order was not on the second reading, but before the Select Committee. The second reading was passed by a considerable majority, in accordance with that view; and he did not understand the object of proposing this instruction. The honourable gentleman did not want to oppose this particular Order in an ordinary and legitimate way, but to separate it from the other Orders, so that he might move its rejection on the third reading, which was not the fair or customary course. In order to get an explanation from the Government, he moved the adjournment of the debate.

Mr. MELLOR said if the instruction, which he thought reasonable under the circumstances, was adopted, he proposed that the Order should be sent to a Select Committee, where it could be properly investigated. He did not propose that it should go before the Committee on Unopposed Bills, of which he was Chairman, because he thought this course would be unfair to the persons concerned. Before a Select Committee the objections of the honourable member could be dealt with.

Mr. H. H. FOWLER, on behalf of the Government, endorsed this view. All that the Government wanted to avoid was this Bill going before the Committee on Unopposed Bills.

Sir MICHAEL HICKS-BEACH asked if the course proposed was in order, as no petition had been presented against the Bill.

The SPEAKER replied that this fact did not put the motion out of order. The course suggested by the Chairman of Ways and Means seemed a feasible one.

Mr. FOWLER offered to accept the motion for the adjournment, if there was the slightest doubt in the mind of the honourable baronet.

Sir MICHAEL HICKS-BEACH intimated that he did not wish to further oppose the matter that day; and the instruction was adopted.

The following progress was made with Bills last week:—

Bills read the first time, and referred to the Examiners: Electric Lighting Provisional Order Bill (No. 7) relating to Newmarket; Pontypridd Local Board (Gas) Bill.

Bills read a second time and committed: Crystal Palace District Gas Bill; Water Provisional Orders (No. 1) Bill.

Bills reported: Electric Lighting Provisional Orders Bill (No. 4); Leeds Corporation (Consolidation and Improvement) Bill.

Bills read the third time and passed: Aberdeen Corporation Bill; Bodmin Water Bill.

Petitions against the Bilston Commissioners (Water) Bill were presented from the Corporation of Wolverhampton and Guardians of the Poor of the Seisdon Union; and against the Crystal Palace District Gas Bill, from the Beckenham Local Board and the London County Council.

HOUSE OF COMMONS COMMITTEE.

(*Before Sir R.* TEMPLE, *Chairman; Mr.* LYELL, *Mr.* MYERS, *Mr. G. R.* BENSON, *and Mr.* BONHAM-CARTER, *Referee.*)

Friday, March 17.

After the proceedings on the Stonehouse Local Board Bill (as reported last week, p. 1006), the Committee proceeded to the consideration of the

PLYMOUTH CORPORATION WATER BILL.

This Bill, promoted by the Plymouth Corporation, is to obtain power to construct additional water-works at the Head Weir.

Mr. POPE, Q.C., Mr. BALFOUR BROWNE, Q.C., and Mr. FREEMAN appeared for the promoters. The petitioners against the Bill were represented as follows: Mr. CRIPPS, Q.C., for Sir Massey Lopes; Mr. PEMBER, Q.C., Mr. BIDDER, Q.C., and Mr. A. YOUNG, for the Stonehouse Local Board; and Mr. SAUNDERS, Q.C., for the Earl of Morley. The Roborough Highway Board and Sir F. Fuller Elliot Drake also petitioned against the Bill; but in their case Counsel was reserved.

Mr. BALFOUR BROWNE, in opening the case, explained that, under an Act passed in the reign of Elizabeth, the Corporation of Plymouth acquired the whole of the water which flowed down to the Head Weir from a watershed of 4885 acres. Their present proposal was to construct a reservoir, so that the floods which occurred in winter might be stored for use in the summer, and to convey the water by iron pipes underground to a service reservoir at Roborough. In 1887 the Corporation obtained power to construct a reservoir below the Head Weir. Owing to certain circumstances, Mr. T. Hawksley, the Engineer of that scheme, selected a site which did not commend itself to him. He preferred the one now chosen, which was admirably suited for the purpose. By means of a very small dam, the whole valley could be converted into a reservoir. It was so good that Mr. Mansergh advised the Corporation not to make any trial pits. The dam would be of masonry; and a liberal water compensation for 210 acres of watershed would be taken to the south of the reservoir, and 263 acres to the north, which they were not entitled to take under the Act. This practically satisfied all the riparian owners, except Sir Massey Lopes, who had made an admirable bargain, from his point of view, in connection with the Stonehouse water scheme. He was to receive £400 a year for nothing, because the water did not belong to him. Sir Massey probably thought he might be able to make a similar bargain with Plymouth; but he would not, unless the Committee compelled them to yield to him. The Corporation, of course, refused to give any compensation for the water they obtained from the watershed of 4885 acres, which they took under the Act of Elizabeth, and which was confirmed to them under the Act of 1887. If Sir Massey Lopes contested the right of the Plymouth Corporation to this watershed, he should have done so when the Act of 1887 was before Parliament. Lord Morley and Sir Francis Drake also petitioned against the Bill as riparian owners; but their principal objection was on the ground that the compensation water was inadequate. The opposition of the Stonehouse Local Board was dictated merely because Plymouth was opposing the Stonehouse Bill.

Monday, March 20.

On the resumption of the inquiry this morning, evidence was called in support of the Bill.

Mr. *E. Sandeman*, Assoc.M.Inst.C.E., Water Engineer to the Plymouth Corporation, explained that the site on which it was proposed to construct a reservoir at the Head Weir under the Bill of 1887 was abandoned because a solid foundation for the dam could not be obtained at a reasonable depth. The site now selected was most admirably situated for reservoir purposes. The dam would cross the valley at a point where it narrowed practically to a gorge, with steep rocky sides; and at the top water-line, it would be only 340 feet long. For many years past, there had been a great want of water in the borough; but the present scheme would amply supply the needs of both Plymouth and Stonehouse for the next 25 years.

Cross-examined by Mr. BIDDER, witness said he was the author of the scheme; but Mr. Mansergh was consulted before its adoption by the Council. Although the site of 1887 had to be abandoned because a solid foundation could not be obtained for the dam, he did not think it advisable to sink trial pits on the line of the new one. Besides the main dam across the gorge, a smaller dam would be constructed to prevent the water flowing out over the reservoir into the valley. Since the adoption of the scheme, a trial pit had been sunk on the line of the small dam, and rock had been found at a depth of 34 feet. This was at a point at the centre of the proposed dam. Arrangements had been made with Mr. Tracey Elliot, one of the riparian owners below the reservoir, to discharge 155 gallons of compensation water per minute in respect of 430 acres of watershed. The reservoir would cover an area of 103 acres at the level. Its storeage capacity would be 545 million gallons; and the available supply in dry weather would be 6 million gallons per day.

By Mr. SAUNDERS: The reservoir would store 170 days' supply. Originally it was proposed to construct a reservoir of only 422 million gallons capacity; but, on Mr. Mansergh's recommendation, it was decided to raise the dam by 3 feet. This was rendered necessary partly by the obligation to provide compensation water for the stream. Under the Bill, the Corporation would have power to raise the dam 3 feet higher still at some future time; and this would add something like 75 million gallons to the storeage. If the reservoir authorized by the Act of 1887 had been constructed, its capacity would have been 350 million gallons. Lord Morley's mills at Marsh Mills required 11,000 gallons of water per minute to work them. When the leat fell below this flow, the water power had to be supplemented by steam. The total compensation water to be discharged from the reservoir would be 230 gallons per minute; the 155 gallons to be given in consequence of the arrangement with Mr. Tracey Elliot being in addition to 80 gallons per minute originally suggested. Under the Bill, the Corporation proposed to take the water from a catchment area of 4855 acres authorized by the Act of 1887, and an additional area of 470 acres. The water from this latter area was not really necessary for the supply of the town; but it would flow into the reservoir because of the situation of the dam farther down the river.

The CHAIRMAN: What is the nature of Lord Morley's claim?

Mr. SAUNDERS: We say the whole of the water from these 470 acres should be allowed to pass down the stream, inasmuch as it is not wanted for the supply of Plymouth. It only flows into the reservoir as an accident.

The CHAIRMAN: You want more compensation water than the usual one-third?

Mr. SAUNDERS: Yes, one-third is given when the town wants the water; but Plymouth does not require it from this additional area of 470 acres.

In cross-examination by Mr. CRIPPS, witness admitted that, with the exception of a small portion of land, the reservoir of 1887 would have been situated on the property of Sir Massey Lopes.

Mr. CRIPPS intimated in his next question that Sir Massey Lopes had made certain proposals for the protection of his property, but that the Plymouth Corporation had not replied to his communication.

Mr. BALFOUR BROWNE said some of Sir Massey Lopes's proposals were unreasonable; but others might be met. They were quite willing to meet Sir Massey, and discuss these matters with him.

Mr. CRIPPS regretted that this suggestion had not been made before. Much of Sir Massey Lopes's objection would be met if what was known as the Birmingham bursting clause were introduced into the Bill, giving compensation to owners of property below the reservoir for any damage which might be done in the event of the dam bursting.

Mr. BALFOUR BROWNE: We will give that clause for the benefit not only of Sir Massey Lopes, but of all the people down the stream.

In re-examination, witness said he had no doubt the dam would be perfectly safe. One embankment would be on Sir Massey Lopes's land. With regard to Lord Morley's claim, the Corporation at present in dry weather took the whole of the water above the Head Weir from a watershed of 4500 acres; and consequently in times of drought not a drop of water from that catchment area reached the mills. The compensation water proposed to be given for the additional catchment area was ample; but Lord Morley was really trying to get compensation water for the part of the watershed which belonged exclusively to the Plymouth Corporation.

By the COMMITTEE: The small dam would extend about 38 feet below, and 13 feet above, the level of the ground.

Mr. *J. Mansergh*, M.Inst.C.E., stated that he had carefully examined the site of the proposed reservoir. Apart altogether from the site of 1887, which was abandoned in consequence of the great cost of constructing a dam there, he should have selected the Burrator site as the most suitable for a reservoir in the whole Valley of the Meavy. With a dam 340 feet long at the top, and a greatest depth of 74 feet, a reservoir with a surface area of 104 acres, and impounding 545 million gallons of water, could be constructed at reasonable cost. Not the slightest difficulty, he anticipated, would be experienced in finding a solid rock foundation for the dam; and there was no question whatever about the possibility of making it perfectly water-tight at reasonable cost. The available watershed above Burrator was about 5000 acres. It was a moorland district without population, and the water was admirable; indeed, he had never seen more beautiful water than that which was now running down the Plymouth leat. Its altitude ranged from 625 feet in the bed of the river at the site of the Burrator dam to 1500 feet in certain places. The average rainfall over the watershed was 61 inches per annum, from which 14 inches had to be deducted for evaporation. After the reservoir was constructed, Plymouth would have a supply in times of drought of 35 gallons per head per day for a population of 146,000. With 230,000 gallons of compensation water per day discharged into the stream, the position of Lord Morley as a millowner would be improved in dry weather. At certain seasons of extreme drought, the compensation water would be treble the natural flow from the 470 acres of additional

watershed which the Corporation were annexing. The reservoir works could be constructed in five years. No doubt, the reservoir would be more complete if there was a by-wash or flood-water channel; but such an adjunct was not necessary in this case. Flood-water channels were not needed so much with large and deep reservoirs as with shallow ones. Silting would, of course, take place in the Burrator reservoir; but the plans provided for the construction of a residuum lodge at the head of the reservoir for the interception of silt. Part of the scheme included the laying of iron pipes from the storeage reservoir at Burrator to the service reservoir at Roborough. This he regarded as absolutely necessary. It was a scandal that the open leat, by means of which the water was at present conveyed, had not long since been replaced by iron pipes.

In cross-examination by Mr. BIDDER, witness admitted that he did not know to what depth the valley at Burrator was filled with deep boulders of granite; but he stated that, in his estimate, he had allowed nearly 40 feet as the depth of the foundation of the dam, which he believed was ample. As the foundation increased in depth, the cost would increase also. If, instead of 40 feet, the ground had to be excavated to a depth of 80 or 90 feet for the foundation, the works would take six months longer to construct. Questioned further, witness admitted having reported to the Corporation that 2100 million gallons of water were daily wasted in Plymouth. To some extent, therefore, the necessities of the borough for a further supply arose from the fact that the people were extravagantly wasteful in their consumption of water.

Mr. BIDDER: If they reduce the consumption to what satisfies other towns, and give up their ambitious scheme for absorbing Stonehouse, they will have water enough for some ten or fifteen years at least?

Witness: No; I do not think they will. If they should have a dry summer like that of 1887, they will be in absolute straits for water.

Mr. CRIPPS here stated that, so far as Sir Massey Lopes was concerned, the question of compensation water had been settled.

Mr. *Hill* and Mr. *Bryan* were next called; and they both emphatically supported Mr. Mansergh's evidence in regard to the suitability of the Burrator site for the proposed reservoir.

Mr. *W. Topley*, F.R.S., F.G.S., stated, as a geologist, that none of the objections of the Head Weir site applied to the Burrator site, as at the latter place the rock was thoroughly solid. The gorge was, in every respect, one of the best conceivable sites for the construction of a dam; and he believed the work could be carried out at comparatively small cost.

Mr. *G. D. Bellamy*, Borough Surveyor, Plymouth, stated that he had always entertained a strong preference for the Burrator site. The Head Weir site was chosen to avoid the expense of opposition.

Mr. BALFOUR BROWNE intimated that this concluded the case for the promoters. He added that he had not proved the necessity for a storeage reservoir, because this fact was established by the Act of 1887.

Lord *Morley* was then called, and gave evidence in support of his petition against the Bill. He said all he asked was that water which Plymouth did not actually require, and which would be useful to him in working his mills, should be sent down the stream. He should prefer compensation in water; but, if there was an insuperable difficulty in giving it, he thought his tenant and himself should be entitled to it in some other form. It was hardly fair that Plymouth should take water from the stream and sell it to Stonehouse without compensating him for the loss.

Mr. *R. Harvey Daw*, tenant of the Marsh Mills, and Mr. *W. Barry*, were the next witnesses. The latter, in cross-examination, stated that Lord Morley's rights were not considered when the Bill of 1887 was before Parliament; and he regarded the present as a fair opportunity for securing their recognition.

The CHAIRMAN suggested that some compromise might be come to between Lord Morley and the Corporation.

Mr. SAUNDERS said he thought a definite expression by the Committee would be the most effectual means of bringing the parties together.

The CHAIRMAN intimated that the Committee proposed to reserve their decision on both the Plymouth and Stonehouse Bills until they had considered the Devonport Water Bill.

Tuesday, March 21.

Mr. SAUNDERS this morning addressed the Committee on behalf of Lord Morley. He said that, as a riparian owner, his Lordship was interested in the fishery of the Plym; but it was not on this ground chiefly that his opposition was based. His principal object was to secure that sufficient compensation water was passed down the stream for the benefit of the Marsh Mills. No doubt the general rule was for the Corporation to take two-thirds of the stream in dry-weather flow, and to yield one-third to the river by way of compensation; but this was a rule that was not without exception. Even in the present case, it had not been observed, because the Plymouth Corporation had agreed with Sir Massey Lopes and Mr. Tracey Elliot to discharge into the stream more than one-third of the flow from the extra watershed they now proposed to annex. The Marsh Mills, though ancient, were fitted with modern machinery, and considerable expense had been incurred for the purpose of working them whenever there was a deficiency of water. Naturally the tenant was not anxious to resort to steam when he could possibly use the stream. He was, therefore, perfectly entitled to demand that, unless the water from the additional watershed now proposed to be included was required for Plymouth, it should not be taken away. There was an entire absence of any proof on the part of the Plymouth Corporation that this additional water was needed. Under the Act of 1887, Plymouth was entitled to impound an average daily flow of 10 million gallons. How could it be said that, having this quantity, they had any right to take another million gallons from the additional watershed merely for the purpose of selling it to Stonehouse, which, if the Stonehouse Bill passed, would have its own independent supply? He therefore asked that not merely the 400 gallons per minute which had been conceded to Sir Massey Lopes, but that 700 gallons per minute, or at the rate of a million gallons per day, should be discharged from the reservoir into the stream, as compensation water in respect of the extra watershed. He also submitted that, when the flow from the present watershed above the Head Weir exceeded 6 million gallons per day, the Corporation should discharge an additional 2300 gallons per minute into the stream. This compensation water Lord Morley lost by not opposing the Bill of 1887; but, as that omission was quite accidental, he was entitled now to ask the Committee to put him in the position he would have occupied in 1887.

Mr. *E. Pritchard*, M.Inst.C.E., was then called, on behalf of the Stonehouse Local Board, in opposition to the Bill. He stated that he had examined the Burrator site and watershed, and that there was very little difference between the water at the Head Weir and at Cadover Bridge; both containing slight peaty qualities. The trial hole sunk on the line of the subsidiary dam at the Head Weir was full of water; and a specimen of rock taken from the hole proved to be granite in a state of decomposition. It was a matter of uncertainty to what depth the excavations would have to go before the dam could be constructed; and consequently it was quite impossible to estimate accurately the cost, or the time it would occupy to make. The Burrator reservoir would combine the advantages of a deep, with the disadvantages of a shallow one. Its surface area when full would be 105 acres; but, when the level of the water fell 16 feet below the top, the water area would be reduced to less than 50 acres. Although 75 feet deep at the dam, the reservoir rose sharply; and half of it was consequently less than 16 feet deep. If the water in the Cadover reservoir were lowered proportionately, the area would be reduced from 24 to 15 acres.

In answer to the CHAIRMAN, witness stated that he quite concurred with Mr. Mansergh and Mr. Hill as to the excellence of the site for the dam at Burrator, but not of the reservoir. If those gentlemen had considered the extreme shallowness of the reservoir when the level of the water fell by 16 feet, they would never have supported the scheme so strongly.

Lord *Mount Edgcumbe* said the people of Stonehouse believed that under their scheme they could get water at a cheaper rate than any offer they were likely to have from Plymouth. He had always had the impression that the Plymouth Corporation desired to include Stonehouse in the borough; but his belief was that the amalgamation of the two towns would be injurious to Stonehouse. Moreover, the inhabitants of that town did not care for incorporation.

Mr. POPE: What it amounts to is that, if a proposition is made to Parliament to incorporate the two towns, Stonehouse would oppose it on the usual grounds?

Witness: Yes; but I think the question has a bearing on the present inquiry, because it has been openly announced that Plymouth is opposing the Stonehouse Water Bill, and desires to supply the township with water, because it would ultimately lead to incorporation.

Mr. POPE: Assuming that the policy of Parliament is towards the absorption of small governments by the surrounding larger ones, do you not think it is bad political economy that there should be three capital expenditures for water-works when one would suffice?

Witness: Of course, that is possible. But these are two distinct areas; and at present the municipal government of Stonehouse is independent and complete.

Professor *Robinson* was the next witness. He said he did not consider the rock sound at the subsidiary dam. He had not made a close examination of the rock at the big dam; but he thought the depth to which it would be necessary to go, and the expense involved, would be a matter of great uncertainty. The reservoir, though 75 feet deep in some places, was generally shallow; the only deep portion being in the gorge itself.

Mr. *G. F. Deacon* stated that he had made an inspection of the site of the Plymouth water supply, including the dam of 1887; and the result was that he considered the reservoir was generally shallow. He did not think it was expensive compared with other reservoirs, for the reason that in the district there was a steady rainfall.

Mr. BALFOUR BROWNE: But is the site of the reservoir a good one?

Witness: You might make it a water-tight reservoir, but not an ideal one.

The CHAIRMAN: You have heard the evidence of Mr. Mansergh and Mr. Hill. Did you regard it as a strong commendation of both the dam and reservoir?

Witness: I should say yes, putting aside the peculiar features which I have mentioned—viz., the extraordinary shallowness and flatness of the reservoir up to a point a very short distance above the proposed dam. The site of the dam in itself is a good one; but it is expensive in respect of its length.

Could the difficulty as to the shallowness be overcome by lengthening the dam?—Yes; but that would be very expensive.

Mr. BIDDER then addressed the Committee on behalf of the Stonehouse Local Board, in opposition to the Bill; contending that the ulterior object of the measure was to make Stonehouse part of Plymouth. The evidence adduced had shown that there was no scarcity of water at Plymouth, except when, as had been the case, the supply was needlessly drawn upon—in fact, it had been extravagantly and atrociously wasted. Mr. Mansergh had stated that the quantity of water used amounted to 58 gallons a day, and that he had found 40 gallons going off at night. In most towns, 25 gallons a day was considered adequate; and 28 gallons a day was regarded as a most liberal supply. Plymouth had ample water for all domestic and trade purposes; and it was never suggested by the Local Government Board Inspector that Stonehouse should rely on Plymouth for its supply. They did not want to interfere with Plymouth; and he only asked that Plymouth should not be allowed to interfere with them.

This closed the case for the Plymouth Bill.

The Finances of the Nelson Corporation Gas and Water Departments.—According to the annual financial statement of accounts for the borough of Nelson, there is a considerable deficiency on the year's estimates, owing principally to lessened income from the gas and water works. In the gas, the estimated income fell short by nearly £3000; and in the water, by £300. An increase of the rates to the amount of 5d. in the pound is recommended for the ensuing year.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

Thursday, May 1.

(*Before the* LORD CHIEF JUSTICE *and a Special Jury.*)

Sopp v. Bromley Gas Consumers' Company.

This was an action to recover damages for injuries sustained through the alleged negligence of the defendants, in allowing leakage from their gas-works into a natural watercourse running past the plaintiff's premises, in consequence of which he alleged that he had lost one horse, and the services of five others through illness. The defendants denied the negligence, and further averred that, if any pollution had occurred, it had not been caused by them.

Mr. KEMP, Q.C., and Mr. OVEREND appeared for the plaintiff; Mr. COCK, Q.C., and Mr. SCOTT represented the defendants.

Mr. KEMP, in opening the case, said the plaintiff was a miller carrying on business at the Southend Mills, Catford, Kent. For many years the mill had been supplied with water from the River Ravensbourne, which ran past the works of the defendants. This stream, when it arrived at the plaintiff's premises, joined an additional one and formed a pond, by means of which the mill was worked. It appeared that the water had been used for a great number of years, not merely for the mill, but for domestic purposes, and for watering the horses. To the pond there had been, and still was, a series of steps, down which persons passed for the purpose of obtaining water. In December, 1891, and January, 1892, complaints had been made of the pollution of the river; and it was discovered that this was caused through leakage upon the defendants' gas-works, whereby poisonous fluid was discharged into the water, which had the effect of killing the fish. The attention of the defendants was called to this leakage; and they acknowledged that it existed. Shortly afterwards, several of the plaintiff's horses became ill; but the cause of the illness could not be ascertained by the veterinary surgeons who were called in. Then the fish in the pond began to die. As soon as other water was given to the horses, they became better, and the serious illness passed away. The plaintiff alleged that the state of things which caused the illness arose from pollution of the stream by matters coming from the gas-works. It was difficult to show how, when, and under what circumstances this pollution occurred. All he could do would be to show that the stream was polluted by the discharge, and that the state of things was similar to that existing when the fish were poisoned; and he suggested that the water which came from the gas-works, polluting the stream as it passed down, found its way into the pond, polluted it, killed the fish, and rendered the water unfit for drinking purposes—thus causing the injury complained of. He asked the jury to say that the cause which killed the fish was the same as that which rendered the horses ill. They had the cause and the effect—pollution of the stream by the gas-works causing the death or laying up of the horses; and consequently plaintiff claimed damages in respect of the nuisance.

Mr. COCK pointed out that the gas-works were situated at a distance of nearly four miles from the plaintiff's premises.

Mr. *A. Sopp*, the plaintiff, was then called, and said that for the last 28 years he had used the water from the River Ravensbourne for stabling and domestic purposes.

Friday, June 2.

Mr. *Sopp*, continuing his evidence this morning, said the practice of taking water from the stream for the horses had continued for a great number of years. He then gave in detail the particulars of the illness of each of his horses, which, he said, lasted for periods varying from three days to ten weeks. He consulted Mr. Ingersoll, a veterinary surgeon; and, in consequence of what this gentleman said, he discontinued watering his horses from the stream, and gave them water from the main of the house—the result being that they gradually became better. When at work, his horses earned 50s. a week each. He wrote to the Company informing them that his horses had been injured by drinking water fouled by the gas-works; and to this the Secretary replied, denying liability.

Mr. *Matthew Bates*, Inspector of Nuisances for the Bromley Local Board, was then called. He stated that, in consequence of complaints of offensive smells arising from the river, he went to the Bromley Gas-Works, and saw gas tar leaking from a tank into the river.

Cross-examined: On the defendants being made aware of the leakage, they instructed Messrs. Lucas and Aird to construct a dam to prevent it; and this proved effectual.

Mr. *Ingersoll*, a veterinary surgeon, stated that he was called in last November to see the plaintiff's horses. He first of all thought they were suffering from influenza; but he afterwards came to the conclusion that they were affected by drinking water from the river polluted with gas tar.

Cross-examined: There was nothing in the condition of the horses inconsistent with influenza. The treatment he prescribed was the same as he should have directed for influenza.

Mr. *Airey*, a veterinary surgeon at Bromley, said he was called to see one of the horses. He was puzzled as to what was the matter with it. If it had been drinking water polluted with gas tar, this might have accounted for its condition. The symptoms were not the same as those of influenza.

Cross-examined: He had never treated a horse poisoned by gas tar.

Mr. *Pooley*, Public Analyst for Essex, deposed to having made an analysis of some mud furnished to him by the Solicitor for the plaintiff. In his report, he stated that the mud consisted of sand and sewage deposit in a state of decomposition. There were also traces of the remains of a putrid fish, and some oily substance. Certain sulphur compounds might go down the stream from the gas-works—such, for example, as sulphocyanides and carbolic and acetic acids derived from gas tar. If any of these substances were carried down the river for 3¼ miles, their presence could be ascertained. Carbolic acid particularly would be carried a very long distance.

Cross-examined: Ammoniacal liquor which might escape from a gas-works would differ according to the quality of the coal and the process of distillation adopted. The constituents of ammoniacal liquor were very volatile.

Mr. *Cobell*, an owner of land on the banks of the Ravensbourne, about three miles from the defendants' works, said that, at the end of 1891, he found the fish were being killed. In consequence of this, he sued the Gas Company for penalties and for damages to his fishing; and the Company paid the statutory penalty of £200, for polluting the stream, and £50 for the damages sustained by witness. About this time, he noticed iridescent matter floating on the top of the water.

Mr. *W. Lomas*, landlord of the Tiger's Head, said his premises adjoined those of the plaintiff. He had a horse that was made ill through drinking water from the stream.

Mr. *H. W. Amos*, Secretary of the Company, was next called on his subpœna. He stated that early in January, 1892, there was a leakage of ammoniacal liquor from a tank on their works. Immediately on its discovery, this leakage was stopped by the erection of a dam. Complaint as to the destruction of fish was made by Mr. Renshawe as well as by Mr. Cobell.

This being the close of the plaintiff's case,

Mr. SCOTT submitted that no case had been made out which he was required to answer.

His LORDSHIP, however, declined to accede to this view.

Mr. *W. Woodward*, the Company's Manager, was the first witness called for the defence. He said the dam was constructed on the 15th of January. There was one mill between their works and the plaintiff's mill; and there were several streams and tributaries running into the river. There were some dyers' and cleaners' works above the gas-works. He had sent to Professor Lewes a sample of the ammoniacal liquor that escaped from their works.

Professor *Vivian B. Lewes* said he had received from Mr. Woodward a sample of ammoniacal lipuor, which he found to be of a perfectly normal character, differing in no way from the liquor obtained from gas-works using the same class of coal. The constituent parts of the liquor were ammonia salts, ammonia carbonate, ammonia chloride, and ammonia sulphide; and there were traces of other ammonia salts. The larger proportion of the constituents of ammoniacal liquor were volatile. The only one which would be dangerous in small doses would be ammonia cyanide, the quantity of which in the sample analyzed by him was too small to estimate. Taking the extent of leakage at 500 gallons, or double what he was informed was the actual amount, he estimated that 3000 gallons of the water would be required to represent a poisonous dose.

Cross-examined: He had not tested the water of the Ravensbourne. He should not expect the non-volatile portions of the ammoniacal liquor to sink.

Mr. *Springelt*, a veterinary surgeon practising at Bromley and Sydenham, said there was a large outbreak of influenza in the district in the early part of 1892. The disease manifested itself among horses in various ways. The symptoms experienced by the plaintiff's horses were very common in influenza cases, and were not at all like those of poisoning. The sample of liquor analyzed by Professor Lewes would not be injurious to horses. It would require half a drachm to a gallon to be a poisonous dose. Assuming a horse to take in cyanide of ammonia, the effect would show itself immediately. It was not a cumulative poison, but would pass through the body. He attended many cases of influenza in horses in the immediate neighbourhood about the time in question.

Cross-examined: He had known cases of influenza cured by changing the drinking water.

Professor *W. Pritchard* said he had heard the properties of ammoniacal liquor described by Professor Lewes; and there was nothing in it which would be dangerous to horses, if taken in small doses. Judging from the symptoms described, he should say the horses had suffered from influenza, and not from poisoning.

Cross-examined: The symptoms were inconsistent with poisoning, in this respect—that the horses were ill for some time.

Mr. *A. M'Intosh*, a carman and contractor, who resided higher up the stream than the plaintiff, proved that his horses had drunk the water from the Ravensbourne, and had not been made ill.

Mr. SCOTT then summed up the evidence, and submitted that the plaintiff had not proved that the illness of the horses was due to drinking the water of the river. He did not deny that there had at one time been an escape of ammoniacal liquor from the tank; but this was immediately rectified, and before the plaintiff's horses became ill.

Mr. KEMP, replying on behalf of the plaintiff, said it was not disputed that his horses had been made ill from some cause, and that they became better when they ceased to drink the water from the river. Coupling this circumstance with the fact of the fish having been poisoned, the jury could not, he thought, but come to the conclusion that the plaintiff's horses had suffered from the pollution of the water caused by the defendants.

The LORD CHIEF JUSTICE, in summing up, pointed out to the jury that dates and distances were very material here, and that the duty of making out his case rested on plaintiff, who had to satisfy them as to the cause of injury to his horses. Although, no doubt, the killing of the fish was a strong point in plaintiff's favour, it was not conclusive, because the horses were not taken ill until some weeks later; and they had to deal with a swift-running stream, and not with a stagnant pool. In such a case, cogent proof should be given by the plaintiff as to the cause of his damage, otherwise the defendants were entitled to recover. It was often said, perhaps unfairly, that if defendants did not cause it, who did? But here that question had been met by the defendants, who contended that the symptoms shown by the horses were absolutely consistent with influenza. His Lordship then proceeded to deal in detail with the whole of the evidence.

The jury returned a verdict for the defendants.

Reductions in the Price of Gas.—The Seaford Gas Company intend to reduce the price of gas 3d. per 1000 cubic feet after the 24th inst. The Directors of the Stirling Gas Company have reduced the price of gas from 3s. 11d. to 3s. 7d. per 1000 cubic feet.

MISCELLANEOUS NEWS.

THE PURCHASE OF THE STOURBRIDGE GAS-WORKS BY THE IMPROVEMENT COMMISSIONERS.

The Arbitration Proceedings.

In December last, as recorded in the JOURNAL at the time, the Stourbridge Improvement Commissioners determined to exercise the power which had been conferred upon them by Parliament of acquiring the works of the local Gas Company; and they accordingly gave the necessary notice that they desired to purchase and to enter into possession of the property as from June 30, 1893. Negotiations were at once opened; but, as will have been gathered from references which have been made to the matter in these columns from time to time, the parties could not arrive at a satisfactory agreement. The ordinary dividends of the Company amount to £3450; and the number of years' purchase of this sum was, of course, the question at issue, and it had to be referred to arbitration. The proceedings, as mentioned a fortnight ago, were conducted at the Westminster Palace Hotel, London, and occupied three days—May 8, 9, and 11. The Arbitrators were Mr. George Livesey, for the Commissioners, and Mr. Thomas Newbigging, for the Gas Company; and the Umpire was Mr. J. Shiress Will, Q.C. There was a good array of Counsel—the Company being represented by Mr. J. H. Balfour Browne, Q.C., Mr. C. A. Cripps, Q.C., and the Hon. A. Lyttelton; while Mr. Erskine Pollock, Q.C., Mr. C. S. Medd, and Mr. W. J. Disturnal appeared for the Commissioners.

The case for the Gas Company was opened at some length by Mr. Balfour Browne, the greater part of whose speech was of an historical character. He related how the Company, which was formerly a limited liability concern, first obtained parliamentary powers in 1855, with a capital of only £15,000. The Act of that year gave the Commissioners authority to purchase the undertaking by giving to the Company six months' notice in writing. The Company were invested with further powers in 1866, 1871, and 1879. The 1866 Act authorized them to raise £12,000; the 1871 Act extended the limits of supply, and fixed a scale of prices to be charged for gas; and the 1879 Act further enlarged the limits, and allowed additional capital to the extent of £50,000, of which £15,000 has been issued. The ordinary dividends now amount to £3450. Besides the money raised by shares, debenture bonds have been issued to the amount of £5500. In 1891, the Company again went to Parliament, and among other things, asked to be put under the sliding scale. In the Act granted in that year, a clause (section 16) was introduced which remedied certain defects of the purchase clause in the original Act. Counsel quoted the section, which, as he put it, is practically on all fours with the clause in the previous Act; but it fixed five years as the period within which the Commissioners were to exercise the power of purchase. Sub-section 2 is also very important, as it provides that, "in fixing the purchase-money to be paid for the undertaking, any increase of dividend under the sliding scale by this Act authorized, during the period of five years, shall not be taken into account in estimating or fixing the purchase money; nor shall any premium be claimed by the Company on any money forming part of the insurance or reserve funds by this Act authorized." Since the Act was passed, the Company have reduced the price of gas and increased the dividend; but this could not be taken into consideration. Some information was then given by Mr. Browne as to the works. The area of land possessed by the Company is 4 acres 29 perches, for which they paid altogether £3510. All the works are in efficient order; and the Directors have very prudently made excellent provision for the future. The population within the limits of supply is 33,080, and the private consumers number 1367; so that there is room for a large increase of business. The district is covered with 37 miles of mains, 1450 services, and 683 public lamps. In 1882, the quantity of gas sold was 48,950,000 cubic feet. The increase up to 1887 was 7,313,700 cubic feet; and from then to last year, it was close upon 16,000,000 feet. Having quoted these and other figures, Counsel submitted that the Commissioners were bound to pay for this improvement in considering the price; and he further pointed to the absolute security of the dividend of £3450, seeing that the standard price was 3s. 2d. per 1000 cubic feet, while the charge at present is only 2s. 6d. There was another small matter for which he thought the Company ought to be compensated, and that was the gas-fitting business, the profits upon which had averaged, during the past five years, £156 per annum. The Company have no statutory power to carry on this business; and so Counsel only asked for three years' purchase. Then the Company had borrowed £4000 at 3½ and 4 per cent.; and if they converted this into 7½ per cent. shares (as they had power to do), the amount they divided would be increased by £130. Besides this, £1500 had been borrowed at 3½ per cent.; and this could be converted into 5 per cent. stock, which would give them an additional £22 10s. to divide, or together, £152 10s. The total claim made by the Company, and how it was arrived at, was next concisely stated by Counsel. The dividend, he said, was £3450. This, mutiplied by 31 years, gave £106,950. He added 10 per cent. for compulsory sale (£10,695); making £117,645. Taking the £152 10s. which would be gained by converting the borrowed money on the basis of 31 years, worked out to £4727; and 10 per cent. on this (£472), brought it up to £5199. Adding these figures together gave a sum of £122,844 for the gas undertaking, and £468 for the gas-fitting trade.

The first witness to be examined was Mr. Alfred Lass, F.C.A., who had prepared a very elaborate statement on the Company's affairs, which had been accepted by both the Company and the Commissioners. From this it appeared that on Dec. 31 last the total share and loan capital amounted to £55,902 17s. 2d.; the premiums being £8402 17s. 2d. The total amount of capital expenditure on that date was £53,293. Mr. Lass stated that new works were commenced in 1888; and a portion of the old ones had since been pulled down, the original cost of which was altogether £5500. He found that the Company had written off £4726 for depreciation, which indirectly meant that the old works which were pulled down had been charged to revenue account. As to the consumption of gas, he mentioned that the annual average rate of increase during the past decade was 4·22 per cent. He also gave a number of figures referring to the price of gas, from which it was seen that 2s. 8d. per 1000 cubic feet was paid in 1892 for quantities consumed under 100,000 cubic feet, and 2s. 6d. for quantities above that per quarter. The difference between the 2s. 8d. and the standard price was 6d., which entitled the Company to pay 1½ per cent. extra dividend. The Company had paid all the back dividends to which they were entitled. They had no reserve or insurance fund. Referring to a remark made by the Umpire regarding the unaccounted-for gas, witness mentioned that in 1892 it was 12·51 per cent.; in 1891, 14·14 per cent.; and in 1888, 11·76 per cent.; while the gas consumed on the works had been almost stationary—2·65 per cent. in 1888, and 2·23 per cent. in 1892. Proceeding, Mr. Lass stated that the amount at the Company's bankers on the 31st of December last was £491; and cash in hand, £18 10s. The stocks stood at £3612; and there was owing for gas and meter rents a sum of £4815. Besides this, there was the amount which had been expended by the Company to the end of last year on behalf of the Commissioners. With regard to the liabilities, the amount due to consumers for deposits was £444 15s. 5d., with interest added; amounts due to sundry tradesmen, £1139; and interest on the debenture bonds to Dec. 31 last, £98 14s. 5d. The dividend for the six months amounted to £1681; and this left an undivided balance of £2965. Having remarked that the unexpended capital was £2609 16s. 7d., Mr. Lass mentioned that he had to increase this by £571, which was incorrectly charged to the Commissioners direct for new works; and he had brought it in as an asset on the other side. This left £6546, to which had to be added £2966; making together £9512. He explained that it all came to this: Taking the assets as they existed on the 31st of December, and the liabilities in accordance with the Company's books on that date, and paying the half-year's dividend, they had an undivided balance of £2965 16s. 9d. There was an item of £783 to be added with reference to the public lighting, which made the balance £3749. Assuming the Commissioners took over the works, they would be liable for the £425 representing consumers' deposits. Witness assumed that the Commissioners would pay the sundry tradesmen and others; and the interest on debentures and the dividend had been paid. Among further interesting statements made by Mr. Lass was one to the effect that the capital employed per ton of coal carbonized was £6 12s. 2d., or 13s. 8d. per 1000 cubic feet of gas sold, which would be more than £600 per million cubic feet. In 1887, the capital was £30,000. The gas consumed then amounted to 63 million cubic feet; so that the capital worked out to £476 per million feet of gas sold. The balance of net profit brought forward from the profit and loss account to Dec. 31, 1890, was £4446, to which was added £100 drawn from the reserve fund. The half-year's dividend absorbed £1511; and the arrears of dividend paid, £3563. Consequently, the total amount carried forward was about £372. This operation reduced the reserve fund to *nil*. The undivided balance now in the hands of the Company had all accrued since 1890, excepting the £372. A few questions were put to Mr. Lass with regard to the "sums by which the profits were depleted by repair of works." It appeared from his answers that in 1889 the amount charged was £1327; and in 1890, £1067. The following two years it was considerably less—viz., £412 and £776. At this stage, there was some discussion between Counsel as to the accuracy of these figures, in the course of which Mr. Cripps pointed out that the amount for 1891 had been corrected to £903. Mr. Lass subsequently stated that he had, for the first time, heard that the clerk of the works had dissected the wages incorrectly, and had charged certain things to wages instead of to repairs and maintenance. Some other figures referring to the stocks were also given.

Following Mr. Lass came Mr. H. E. Jones, the Engineer of the Commercial Gas Company. In reply to one of the first questions put to him, he stated that the principle he would apply, in approaching the problem of finding the proper value in a case of this kind to be paid by the Local Authority for the gas undertaking, would be to compensate the shareholders for the income or for the thing of which they were to be dispossessed; giving them at least as good a security as they already had. Dealing with the standard or maximum income of £3450 in this case, he capitalized this on the basis of 28½ years' purchase, subject to additional value for certain other elements; and he explained that he attached this value because he could not find at the present time that an investor could secure a good investment—an investment which a shareholder might consider equal to the security in this Company—to pay him more than 3½ per cent. Carrying out his proposition, he arrived at the figure of £98,350; but to this he had a few other items to add. One of these was the conversion of the £5500 of stock, which, it will be remembered, was referred to by Mr. Balfour Browne. The additional dividend which a shareholder would earn by this conversion was £172; and Mr. Jones, capitalizing this at 28½ years' purchase, obtained the figure of £4902. Adding this to the £98,350 gave them the sum of £103,252. Another element to be dealt with was the surplus plant, which, as he rightly pointed out, gives additional security for the maintenance of the dividend in future. He valued the surplus power of production of gas at £8823. This would be equivalent to an output of 31 million cubic feet of gas. He calculated that it would take seven years for the whole of the plant to come into operation; and therefore he took a deferred value on the average of 3½ years. Taking this on the 3 per cent. basis, he obtained a value which was equivalent practically to two years' additional purchase on the original amount of dividend, which was £3600 in the total; and this gave £7200 to add. If, instead of dealing with this as a question of capitalizing revenue, he was dealing with it as structural value, he would arrive at the figures of £7698. By adding the £7200 to the £103,252, he obtained £110,452. Then there was 10 per cent. for compulsory purchase, which came to £11,045; and the expense of winding up (1½ per cent. on £121,497), which amounted to £1822. These figures gave him a total of £123,319, independent of any valuation of stock or stores. Mr. Jones said that in all his experience (extending over the past twenty years), he had never been in an arbitration in which the worth of the stores was not afterwards arrived at by valuation. The debenture debt is to be taken over by the Commissioners, so that witness did not deal with that, but he subsequently spoke very highly of the condition of the Company's plant. The most material points in his cross-examination referred to the question of the number of years'

purchase. Before coming to that, however, he stated that it had been the custom to allow about 25 per cent. more purchase-value in a statutory undertaking than in a non-statutory one; and he admitted that, if the Company were selling by agreement, he could not allow the 10 per cent. for compulsory purchase. On the subject of the number of years' purchase, he said that, at the time money was dearer, 25 years was talked of. In the case of Bradford, they obtained a sum which gave 38 years' purchase; and Hereford gave 28¾ years, with 7 per cent. dividend, which, he believed, was the maximum at the time. The Stafford Corporation paid £70,000 by arbitration, which was rather more than 29 years' purchase; and Newcastle-under-Lyme gave 28 years. Reverting to the question of the conversion of the borrowed money into shares and stock, witness appeared to have overlooked the fact that the debenture stock created under the Act of 1879 could not be allotted at par to the existing shareholders, but would have to be offered for sale by auction or tender. However, it only made a difference of £22 in his calculation; bringing the additional dividend down to £150. Some particulars as to the surplus plant were given by Mr. Jones; and he afterwards expressed his opinion that capital averaging £600, or even £650, per million cubic feet of gas for works on the scale of those at Stourbridge, was not an undue amount. With regard to the 12½ per cent. of unaccounted-for gas, looking to the extent of the mains and to the circumstances generally, witness did not think this an excessive leakage; but he confessed that, if it were his own, he should like to see it reduced.

In the agreement between the Company and the Commissioners, one of the articles provided that, in case of any difference of account, fact, or opinion between the parties, it should be settled by the Accountant (Mr. Alfred Lass), whose decision should be final; and a subsequent article declared that the Arbitrators and Umpire should have regard to the provisions of the agreement. This being so, in opening the proceedings on the second day, the Umpire requested Counsel on both sides to apply their minds to this matter, so that they might be quite clear as to what came within the jurisdiction of the Arbitrators and Umpire, and what within that of Mr. Lass.

Mr. William North, who has been the Engineer and Manager of the Company for the long period of 26 years, then gave some particulars as to the works. From these it appears that it was in 1887 that the Directors decided to re-construct the works; and at that time about £20,000 was expended. Since the new works came into operation, they have been a perfect success; and especially by means of the new railway siding, the Company have been able to effect economies. The retort-house contains six beds of eight, and two spare arches. Of the 96 mouthpieces, about one-half were employed last winter. In explaining how it was that the Company possessed so much surplus producing power, witness stated that early in 1889, or at the end of the preceding year, they resolved to adopt the regenerative system; and, when they did so, the retort-house was partly built. They had gone on so successfully, that they had now reached a pitch of perfection in carbonizing which it would be difficult to surpass—in fact, they were now making 11,250 cubic feet, in place of 5000 to 5200 cubic feet, as a maximum per mouthpiece in 24 hours. The make per 24 hours with three beds was 520,000 cubic feet. In the retort-house, they could increase their output to the extent of five-eighths. The only existing part of the old plant consisted of an 80-feet and a 60-feet holder, and a 30,000 cubic feet per hour station meter. In 1890, the Company erected a new holder 100 feet by 60 ft. 3 in. The total consumption of gas by private persons in 1892 was 72,170,400 cubic feet; and in the public lamps, 9,700,000 cubic feet. He placed the increase in the private consumption between 1882 and 1892 at 47 per cent., or 23,220,400 cubic feet. The £3612 for stocks was about the usual value of what they would have on hand. In cross-examination, further particulars were given by Mr. North as to the new works. The £5500 which Mr. Lass had given as the cost of the old works that had been pulled down was the initial cost price. The maximum dividends had been paid by the Company since 1870. Up to the year 1887, when they commenced erecting the new works, they had extended the system by sums written off for depreciation, to the amount of £8864. Concerning the unaccounted-for gas, when Mr. North took charge of the works in 1867, the leakage was no less than 49 per cent. This he attributed to the fact that the district is partly undermined, and that a few of the pipes might still be in existence which were put down in 1834. The capacity of the three existing holders, he said, amounts to 739,000 cubic feet; while the maximum make per day is about 440,000 feet. Witness gave reasons for deciding to put up a new holder; pointing out especially that, in a place which consumed as much gas in the day as the night, they were at times placed in a very awkward position. When the new holder is completed, the storeage capacity will be 1,189,000 cubic feet; and this, with the present consumption, will be a very comfortable position for the Manager to be in. The cost of the new holder is estimated at about £5000. Questions with regard to the item of repairs brought out the following figures: In 1888, it stood at 3·15d. per 1000 cubic feet; in 1889, 4·70d.; in 1890, 3·52d.; 1891, 2·81d.; and 1892, 2·25d. Witness was sharply cross-examined on the accounts for 1892 to show that, taking the average cost of repairs and the interest which would have to be paid on the capital expended on the new holder and other works, the whole of the margin of profit would be absorbed. But, on the other hand, he pointed to the prospect of a decrease in the price of coal; to the fact that Counsel had omitted the profit on the gas-fitting business; to the power possessed by the Company of raising the price of gas from 2s. 6d. and 2s. 8d. to 3s. 2d. per 1000 cubic feet; and to his expectation that there would be an increase in the value of residuals—sulphate of ammonia in particular. On another point which gave rise to considerable discussion, he said he had come to "the conclusion that the amounts charged to revenue for mouthpieces, ascension-pipes, and such like, would justify one crediting revenue with the old stuff when sold;" but Mr. Lass appeared to have some doubt upon the subject.

Two other engineering witnesses appeared for the Gas Company—Mr. Charles Hunt, of Birmingham, and Mr. Joseph Hepworth, of Carlisle; but they were not examined at any great length. Mr. Hunt spoke highly of the situation of the Stourbridge Gas-Works. Having a siding from the Great Western Railway, the coal, he said, could be dropped into the retort-house at a cost of 1d. per ton; and, in the case of coke, the expense was reduced to a minimum. Besides this, the Great Western Railway was in communication with one of the most advantageous markets for coal—viz., North Wales, and in communication with many of the blast-furnaces in South Staffordshire. As to the works, Mr. Hunt said: "I consider the general condition very satisfactory indeed—in fact, I can point to no works where the conditions are superior." He estimated that an expenditure of £2500 would suffice to double one portion of the plant outside the retort-houses; £1000 would fit up two of the retort-beds which are empty at present; and adding something for another station meter, would make a total of £4200. This would bring up the total manufacturing power of the works to 1,184,000 cubic feet per diem; and he considered the probable increase in the consumption of gas would be such as to utilize the full productive capacity. Had the Company put up a retort-house one-half the size, they would very soon have had to commence again; and constant additions to gas-works cost more than a fairly large outlay to commence with. Gas was supplied in Stourbridge at a cheaper rate than by any of the other companies in the neighbourhood; and yet, taking the balance-sheet of 1892, he found the profits realized per ton of coal carbonized amounted to 11s. 3·8d. As the plant was capable of producing fully 20 per cent. more gas without further outlay for plant, this should of itself substantially increase the profits; and he anticipated that, in five or six years' time, they would be getting at least £6000 per annum. Taking the years beyond that, the output could be nearly doubled at the expense of the £4200 he previously mentioned. He valued the surplus plant at £9000; but he calculated the standard dividends at 31 years' purchase, making £106,950, which was inclusive of this plant. He had added 10 per cent. for the right to convert borrowed money into share capital. The difference between the standard dividend of 7 per cent. and the interest of 4½ and 3½ per cent. now paid, amounted to £130, which capitalized equalled £4030, and made a total of £110,980. Adding 10 per cent. for compulsory sale (£11,098), brought the total to £122,078. This, of course, was exclusive of stocks in hand for winding-up expenses. Comparing Stourbridge with the surrounding mining districts, witness considered 12½ per cent. leakage was moderate. In the course of his evidence, Mr. Hepworth agreed that 31 was a fair multiplier to take in making a valuation of the Stourbridge works, considering their condition and capacity, the surplus plant, the price of gas, and the large field there was for increasing the consumption. He also capitalized the sum of £130, as representing the conversion of the borrowed money into capital; and gave 10 per cent. for compulsory sale—making a total of £122,078 (the same as Mr. Hunt), exclusive of undivided profits, winding-up expenses, and profits on the fitting trade. He admitted, in cross-examination, that the surplus works had been erected out of capital upon which 7 per cent. dividend had been paid; but still he thought this plant was such an additional security for the profits of the undertaking as to warrant the extra 2½ years' purchase.

The case for the Commissioners was then opened by Mr. Erskine Pollock. He first referred to various Acts, going back to a Statute of George III., to show that the Commissioners were invested with certain powers as to the lighting of their district, and manufacturing and distributing gas for that purpose. As a matter of fact, the Commissioners did, under an Act passed in 1825, light the town up to 1834, when they appointed as their licensees for seven years Messrs. Swift and Dixon, who were the predecessors of the Gas Company, which was formed in 1834. In 1855 an Act was obtained, which conferred upon the old Limited Company power to light the district with gas; but it also, Counsel said, saved the rights of the Commissioners to light the district in competition with the Gas Company, if they desired to do so, and furthermore gave them power to purchase the undertaking. The Company's Act of 1866 confirmed the provisions of the 1855 Act affecting the Commissioners; so that it was clearly in their minds that they did not intend to give up any rights they had previously secured. The relations of the parties continued to 1891, when they were both in Parliament, each with a Bill of their own, which was passed. With regard to the Company's Act, Mr. Pollock pointed out that section 9 absolutely fixed what the capital and dividends were to be—viz., £15,000 at 10 per cent.; £12,000 at 7½ per cent.; and £50,000 at 7 per cent. Therefore he contended that it was not possible, after the passing of this Act, for the Company to increase their ordinary stock under the powers conferred by the 1866 Act in any shape or form—by the conversion of debenture stock or in any other way. Counsel also commented upon the clauses referring to the formation of an insurance and reserve fund, and then passed on to the clauses in the Acts of both bodies dealing with the purchase of the works, the substance of which has already been given. Turning next to the agreement entered into by the Company and the Commissioners in April last, he called special attention to the first clause, which provided that the £5500 of mortgage or debenture bonds should be taken over by the last-named body as from Dec. 31, 1892. Even if, argued Counsel, it was not perfectly clear under the Act of 1891 that these bonds must remain in the condition in which they were at the date of the Act, it was quite plain from the agreement that the bonds were to be handed over to the Commissioners, and that they were to remain, as it were, a mortgage debt upon the undertaking. Now, in the face of this fact, it was sought to treat them, for the purposes of this case, as ordinary capital So strongly did his clients feel on this point, that, if the Umpire and Arbitrators differed from them, they would like to have an opportunity of discussing this legal question elsewhere.

After further argument, the proceedings were postponed to the third day, when Mr. Pollock resumed his speech. At the outset, he admitted that this was not a case in which an attack could be made upon the works of the Company. It was clear, however, that, if there was to be a saving on the 12½ per cent. of unaccounted-for gas, the mains would have to be put in better order. When they looked at the destruction of capital that the present good condition of the works had involved, and at their surplus capacity, he maintained that there was no very great merit the shareholders could take to themselves in respect of that condition. Since 1871, they had always been paid the maximum dividend; and they had received arrears of dividend. Dealing with the capital employed per million cubic feet, he observed that before

the new works were constructed, the figure was £470, while in 1892 it was £682; and he remarked upon the fact that this was £32 in excess of the highest figure given by Mr. Jones. As to the surplus plant, Mr. Jones placed the value at £8823; but they had also in addition to deal with a sum of £6539, *plus* £572, for works entered into before the service of the notice to treat. Mr. North had informed them that this £7000 could be raised at 4½ per cent.; and if this were so, there would be an extra capital charge of £315. The net profit in 1892 was £4642, out of which they had to take, first, the sum of £3450, being the dividend on the existing capital; and then £542 for income-tax and interest. Deducting these two amounts from the net profit, left £650. The expenditure on repairs last year was rather light; being only 2·45d. If to this they added 2d., as they would most likely have to do, it would make the balance £682; and, taking this from the £650, where, he asked, would the large margin be which made the dividend absolutely safe? Continuing, Mr. Pollock mentioned that the value put by the Stourbridge people upon the shares in the gas undertaking was something like 23¾ years' purchase. His learned friend had asked for 31 years' purchase, which was only about 3¼ per cent. for ordinary gas stock; and, when they came to add together the whole of his figures, arrived at a total of £127,061, which exceeded, by close upon £3000, 36 years' purchase. After enlarging upon the manner in which these figures were arrived at, Counsel said that, notwithstanding the undue expenditure of capital, the fact that the Commissioners always had the right to buy the undertaking, and that they had concurrent powers to light the streets, they were willing to take the works of the Stourbridge Gas Company at 25 years' purchase, to include everything.

Evidence was then called on behalf of the Commissioners; the first witness being Mr. Harry Mills, a solicitor, of Stourbridge. He gave testimony to the effect that he bought £500 of 7 per cent. stock in the Company, at a sale by auction in 1890, at the rate of £156 per cent. The £500 would produce £35 per year. Multiplying this, as had been suggested by the other side, by 35½ years, would make a capitalized sum of £1242 10s. Deducting the £780 paid for the stock, left him £462 10s. as profit, for which, he remarked, he had not done a stroke of work. Applying the price realized at the auction to the purchase of the entire undertaking of the Gas Company, would make it work out to £76,890.

The next witness was Mr. Edmund H. Stevenson, of the firm of Messrs. Stevenson and Burstal, of Westminster. His testimony as to the efficiency of the works was that "they are really as good as they can be"—indeed, he had never seen works which pleased him better; but these observations, he intimated, did not extend to the distributing plant. In his opinion, 8 per cent. of unaccounted-for gas would be a proper amount for such a district as that covered by the Stourbridge Gas Company. With an increase in consumption of 4·22 per cent. per annum, he computed that it would be about 20 years before the full number of retorts are brought into use; and he did not think it was economical to erect plant of this character which would last for such a long period at a regular rate of increase. Without the latest additions to the storeage accommodation, he considered it was largely in excess of the requirements. This also was not conducive to economical working, because there was the wear and tear of plant continually going on, and the cost of keeping the holders in order—in fact, before the new holder was brought fully into use it would probably require resheeting. In a district like Stourbridge, he thought the sheets of gasholders would not last, unless carefully preserved, for more than 25 years, as there was a great deal of acid and fumes in the atmosphere. Mr. Stevenson agreed with Mr. Jones that, in purchasing an undertaking, the shareholders should be compensated for the income they were to be dispossessed of, giving them at least as good a security as they then held; but, unlike Mr. Jones, he considered that 25 years was a very fair multiple to take. He looked upon the Company as having always been the licensees of the Local Authority. Multiplying the £3450 by 25, gave them £86,250; and he would not give the Company anything beyond this. They were living under a possible notice to quit at six months throughout the whole of their existence; and therefore he could not see that there was any foundation for a compulsory claim—in fact, he characterized such a claim as "preposterous." As to the balance of £3749 in the hands of the Company, in his judgment this belonged to the purchaser; and speaking of the capital employed per million cubic feet of gas made, he mentioned £500 as a fair amount for works of this size. He strongly contested Mr. Jones's claim to an increase of the number of years' purchase on account of surplus plant, because, had the Company not spent the money on this, the Commissioners would only have had to purchase dividends amounting to £3100; and the works would then have been about equal to their requirements. In witness's opinion, the price asked by Mr. Jones was a most unreasonable one; and, later in his evidence, he gave a number of figures to show that, with the additional charges which would come upon the undertaking for repairs, interest, &c., there would be a deficit of £426. In reference to the life of the sheets of gasholders in the Stourbridge district, it was mentioned, in his cross-examination, that the Company had one holder which was put up in 1864, and which had not been re-sheeted. He still held that 25 years was a generous offer for the works. With regard to the make of gas per mouthpiece, he admitted that 9900 cubic feet was very large; and when informed that it had risen to 11,500 feet, he said this was a most extraordinary yield per retort from Midland coal. He did not think there was anything much in the construction of the retorts to account for the difference between the ordinary production per mouthpiece of 7500 and the 11,500 cubic feet.

The last witness called for the Commissioners was Mr. Corbet Woodall. He also considered the Company had, in a sense, been the stewards of the Local Authority; and he agreed that 25 years' purchase of the dividends would be a proper amount to pay for the undertaking. In his opinion, the shareholders would be able to re-invest their money in a security of like value, and, moreover, they would have some margin to make it safe that they would be able to do so. The capital of the Company was necessarily high; but, as to the rebuilding of the works, he pointed out that they could not construct new works, and immediately have them as productive as the old ones. In the present instance, the increase of capital had been rather remarkable. In 1882, it was £537 per million cubic feet; and in 1887, it was down to £474. This reduction, he said, was effected in two ways—partly by the business increasing, by the more rapid rate of calling up capital, but chiefly by paying off from year to year the appreciated capital out of profits. Now, however, the capital had risen to £682, which, in witness's opinion, was distinctly high for an undertaking of this size. Before passing on, Mr. Woodall took the opportunity of testifying to the admirable character of the works; adding that they had been carried out extremely well and greatly to the credit of the Engineer. It appeared, from further evidence, that his valuation was made in 1891, simply for the purpose of advising the Commissioners; and it was based on the profits of 1890, since which time the price of gas had been materially reduced. Mr. Woodall did not regard as of very much value the security afforded by a margin through which the price of gas might be raised, because to increase the price was a very serious thing to a gas undertaking. On the question of the surplus works, he could not enter seriously into the argument put forward by the other side. His view of the matter was that, when the Commissioners bought the undertaking, they would buy up the dividend, not simply on the productive works, but also on the surplus works. As the Company had been under the contingency of a six months' notice for years past, he did not think that this could be regarded as a compulsory sale at all; and, respecting the conversion of the borrowed money, he thought it was unreasonable that the Company should ask to be compensated for what they did not do. He agreed that they had no right to apply the reserve fund to the payment of back dividends; and as to the stores and cash balances, the former had been purchased out of capital to a large extent, and they had no right to put the latter in their pockets. As to repairs and maintenance of works, he assumed ·4½d. was a fair rate to spend. Mr. Woodall's cross-examination was mainly directed to the question of the number of years' purchase to be allowed. Reference was made to the Newcastle-under-Lyme arbitration in which he was concerned; and in that case he valued the Company at 25 years' purchase.

At considerable length Mr. Balfour Browne then addressed the Court on the case which had been laid before them on behalf of the Commissioners. He submitted that the only Act of Parliament with which they had to deal was that of 1891, because, if the Commissioners had not acted under that Act for five years, all the past legislation was absolutely swept away. Mr. Woodall and Mr. Stevenson said the fact that they were acting as stewards for the Commissioners should be taken into consideration; but they did not appear to have taken it into consideration themselves, because, according to the first-named gentleman's evidence, he had valued other companies at 25 years' purchase. Then as to compulsory sale, the whole question was whether or not the Company were compelled to sell. The clause in the Act was not put in by agreement, but on the petition of the Commissioners; and therefore the Company could not resist the sale. They were compelled to part with the works, and under very rigid conditions. If, he added, there was a case of compulsory purchase this was one; and he asked the Court to allow upon any sum that they might come to the conclusion was the right measure of the value of the undertaking 10 per cent., as the lowest figure which was ever given in a case of compulsory sale. He dilated upon the secure position of the Company; pointing especially to the wide field which they had before them for expanding their business. His learned friend, he further remarked, relied upon the fact that the dividends were limited to £3450; and that by no possibility could they have any more. Supposing that, instead of putting £8000 into the reserve fund and plan (because he treated this as practically a reserve fund), they had carried the money forward to the divisible profits of the next year, did his friend say they had no right to this? He held that they had; and he depended upon the decision of Lords Justices Lindley and Lopes in the case of *Mason and Another v. The Ashton Gas Company*, as reported in the JOURNAL OF GAS LIGHTING.* Regarding the money put into the surplus plant as a reserve fund, that plant belonged to the Company; and therefore they ought to be paid for it. It did not matter if they had the undivided profits in stock, stores, or money. In stores, there was £5230; and at any instant before the arbitration came on, the Company could have sold that off, and have had the amount in cash. Before concluding, he again dealt with the question of the conversion of borrowed money.

Meeting of the Improvement Commissioners.

At the Meeting of the Commissioners on Monday last week—Mr. C. Herbert Collis in the chair—Mr. Walter Jones read the report of the Gas Committee on the subject of the purchase of the gas undertaking. The Committee gave the award of the Umpire, and stated that under it the sum of £99,800 had been fixed as the price to be paid by the Commissioners for the undertaking. The price included a sum of £3749 0s. 7d., which was a cash credit balance representing "liquid assets," consisting of money in the bank, value of stores and stocks, and debts owing to the Company on Dec. 31, 1892, after deducting the unexpended capital and the dividend to that date. The former was £2607 16s. 7d.; making, with the above balance of £3749 0s. 7d., £6358 17s. 2d. in cash credits, stocks, and stores. The Board would not require to borrow any money for working capital, as they took over the existing working capital of the Company. The unexpended balance would have been more by £571 18s. 9d., had not the Directors paid this sum on account of the current works which were included in the existing contracts. In effect, the Commissioners' liability under the contract of Jan. 7 had been reduced by this amount. The offer the Board were advised to make for precisely the same undertaking and property as was dealt with by the award was £87,750. This was on the advice of Engineers and Counsel, and after anxious consideration. Though the award was for a larger sum than the offer, the Committee considered it would not have been prudent or right to have increased it. The Commissioners had, unfortunately, to pay the taxed costs of the arbitration. The Board would naturally wish to know the total cost of the undertaking, and the Committee would spare no pains to obtain the information as soon as possible, and convey it to the Board. The Company claimed by their Counsel £127,000; by their witness

* See Vol. XLV., pp. 160, 205; also Vol. XLVII., pp. 449, 741.

Mr. Jones, £127,068; by their witness Mr. Hunt, £125,827; and by their witness Mr. Hepworth, £125,827; while the Umpire had awarded £99,800. The Commissioners, under their agreement with the Company, of the 25th of May, took over the undertaking as from Dec. 31, 1892, since which time it had been carried on for the benefit of the Commissioners, subject to paying the Company the shareholders' dividend for the half year ending the 30th of June. The report also referred to payments required on certificates connected with the contracts being executed at the gas-works. In the course of the discussion which followed the reading of the report, it was mentioned that the £99,800 to be paid for the gas undertaking was exclusive of the £5500 debentures running, and of the £6000 being expended under contracts. In fact, a total amount of about £114,000 would be required. The report was adopted.

Local Opinion on the Purchase.

Referring to the result of the arbitration, the *Stourbridge Advertiser* for the 27th ult. made the following remarks: "Some there are who are of opinion that the Commissioners will have enough to do to make both ends meet at the price they have to pay; while, on the other hand, it is considered that the Commissioners have done a good thing. Generally, the award was looked upon favourably in the town yesterday. No doubt the Commissioners will have to be very careful in the management of the concern. They have to borrow the money for forty years at 4 per cent., and will have to pay off one-fortieth of the principal besides the interest every year. After ten years they have the option of re-borrowing the remainder, if they can get it at a lower percentage—say, 3½, 3¼, or may be 3 per cent. Supposing the Commissioners do not make a profit, but just manage to clear expenses, it is urged that at the end of the forty years the town will possess a valuable property, and that without having added one penny to the rates. And those who urge this view point out that this is the proper way to look at the matter—that a public body have not to look to the immediate present, but to the future, and that the highest end of local government is not merely to administer for the passing hour, but also for the ultimate good of the community at large."

LANCASTER CORPORATION GAS SUPPLY.

A report on the working of the gas undertaking of the Lancaster Corporation in the nine months ending March 25 last has just been presented to the Gas Committee by the Gas Engineer (Mr. C. Armitage, F.C.S., Assoc.M.Inst.C.E.). It is accompanied by the accounts of the Gas Department for the above-named period, with an abstract prepared by the Borough Accountant (Mr. W. Clough) for the Finance Committee.

Mr. Armitage states that the total receipts amounted to £19,584, and that the expenditure was £13,915; leaving a gross profit of £5669. After providing for interest, &c., there was left a net balance of £2337. This sum exceeds the net balance of the previous twelve months by £799. A sum of £4810 was expended on capital account in the purchase of land; and this left, at the close of the financial period dealt with, an unexpended balance of £8620. The reserve fund now amounts to £7277; and the sinking fund, to £5858. A sum of £926 was charged to the renewal fund for new mains, services, &c.; and this account now exhibits a debit balance of £8725. If the Gas Committee decide to transfer the surplus profit from the net revenue to this account, as they have hitherto done, a sum of £6388 will still remain to debit—a reduction of £1410 on last year. Mr. Armitage explains that the abnormal condition of this fund is brought about by the numerous extensions which have been carried out during the past few years; but he says that, if the Committee adhere to their past policy, the debit balance will soon disappear, as, in all probability, no material change may be anticipated in the near future which will affect the balance of profit from the net revenue account. The rateable value of the gas-works has been increased to £3167, as compared with £2692 in 1890. The net cost of gas in the nine months covered by the report was 1s. 4·23d. per 1000 cubic feet of gas sold, against 1s. 3·99d. for the year ending June 30, 1892; the interest on stock and mortgages came to 6·34d., against 7·42d.; and the net profit was 4·68d., against 2·77d. In 1892, however, the amount added to the sinking fund worked out to 1·08d. per 1000 cubic feet. If this had been included in the nine months' accounts, the net profit would have been reduced to 3·74d., as compared with 2·77d.; showing a net gain of 0·97d. per 1000 cubic feet of gas sold. The average cost of coal and cannel was 14s. 1·02d. per ton; being 1s. 4·90d. and 1s. 5·74d. per 1000 cubic feet of gas made and sold respectively. Coke contributed 3s. 9·33d. per ton of coal carbonized; and the other products, 4s. 5·11d.—making a total return for residuals of 8s. 2·44d., or 58·12 per cent. of the cost of coal—an increase of 2·5 per cent. on the previous financial period. Mr. Armitage reports an improvement in sulphate of ammonia, which advanced £2 per ton in March and April, in consequence of the early and exceptionally fine weather, which created a brisk demand for this product. The consumption of gas in the nine months was 119,667,000 cubic feet. This is an increase of 5,520,000 cubic feet, or 4·83 per cent., over the corresponding period of 1891-2; and the demand continues for all purposes. The works and mains have been kept in an efficient condition; and an extension of the retorts on the regenerator principle is now being carried out. Should the consumption of gas continue to increase, an addition to the purifying plant will soon be necessary. In Lancaster, as in other places, consumers complain of blackened ceilings and deficient illuminating power. Mr. Armitage closes his report with some excellent remarks on these matters; stating emphatically that the gas supplied by the Corporation does not contain any impurity that would blacken the ceiling of any room under any circumstances. With regard to the lighting power of the gas, Mr. Armitage points out that a great deal of this is lost through the use of defective burners; and he recommends the consumers to avail themselves of the advice which the officials of the Gas Department are always willing to give on the subject.

The accompanying table gives the amounts (omitting shillings and pence) of the principal sources of expenditure worked out per ton of coal carbonized and per 1000 cubic feet of gas sold:—

	Amount.	Per Ton of Coal Carbonized.	Per 1000 C. Ft of Gas Sold.
Manufacture	£11,943	19s. 0·18d.	1s. 11·95d.
Distribution	772	1 2·75	0 1·55
Public Lighting	339	0 6·48	0 0·68
Rents, rates, and taxes	558	0 10·67	0 1·11
Management	166	0 3·17	0 0·34
Sundries	310	0 5·93	0 0·61
Gross cost of gas	£14,088	22 5·18	2 4·24
Less residuals and miscellaneous receipts	6,000	9 6·63	1 0·01
Net cost of gas	£8,088	12 10·55	1 4·23
Balance, profit	5,496	8 9·01	0 11·02
Revenue from gas	£13,584	21 7·56	2 3·25
Excess of interest paid over interest received	£3,159	5 0·36	0 6·34
Net profit	£2,337	3 8·65	0 4·68

The following particulars are taken from the working statement: Coal and cannel carbonized, 12,561 tons. Gas made, 125,613,000 cubic feet; do. sold and used on works, 120,470,000 cubic feet; do. unaccounted for, 5,143,000 cubic feet, or 4·09 per cent. Gas made per ton of coal, 10,000 cubic feet; do. sold, 9526 cubic feet, or 95·26 per cent. of the make. Coke made, 8165 tons, or 13 cwt. per ton of coal; do. sold, 6487 tons; do. used as fuel (including boilers), 1678 tons; or 20·55 per cent. on the make. Tar made, 157,950 gallons, or 12·57 gallons per ton of coal. Liquor made, 380,401 gallons, or 30·28 gallons per ton of coal. Sulphate of ammonia produced, 176 tons, or 31·38 lbs. per ton of coal. The net proceeds of coke and other residuals work out to 58·12 per cent. on the cost of coal. The capital employed works out to £9 2s. 5d. per ton of coal carbonized, and 19s. 1d. per 1000 cubic feet of gas sold. The price of gas is 2s. 6d. per 1000 cubic feet; and no rent is charged for meters.

The above report was submitted for adoption, by Alderman Hatch, at the meeting of the Town Council last Wednesday. He remarked that their Manager had so fully entered into the details of the work of the Committee that it really left nothing for him to say. As to the question whether or not they should increase the capital account, the Committee recommended that it should be kept as it was. So far as he was concerned, he was glad the town would have an additional 10 per cent.; but at the same time he looked forward with great confidence to the time (which would shortly come) when the Committee would be able to give them another 10 per cent. He recommended that they should have a large surplus fund, because the work was becoming greater every day. It was not as if they were putting the money into the pocket of any private individual. It belonged to the town; and they could appropriate it at any time. The motion having been seconded, Alderman Smith, M.P., expressed disappointment with the report. On one or two occasions, it had been hinted that the Committee would make some grant to the borough fund. He thought the renewal fund, or a large amount of what had been debited to that fund, was expenditure which ought to be charged to capital account. He would like to see something more than 10 per cent. given to the borough fund. For his own part, he had come to the conclusion that they had bought the gas-works at above their value, or else they must be worth more than at present stood to the capital account. He thought they might ask for a change in the policy of the Committee; and he would propose that £500 be credited to the borough fund. Mr. Bell, in seconding the amendment, said he considered extensions ought to be made out of capital account; and he could not understand why they did not call the renewal fund a capital debt. It was unfair that they should pay out of reserve for things which the law provided should be spread over a period of sixty years from 1880. While giving the Committee credit for trying to keep down the capital debt, he did not see why it should be done by doing an injustice. Alderman Hatch observed that, although the gas-works were purchased for the ratepayers, it was best to look forward to the time when the works would become the property of the town. Money was granted at 4 per cent.; and if the price went on as it had been doing recently; the town might be called upon to pay £20,000 towards freeing the gas-works. Such being the case, he thought the Committee were going as far as was possible. They did not wish to increase the price of gas, as that would fall upon the poor people; but if such a thing as he had mentioned came to pass, they would have to raise the price. After a little further discussion, the amendment was put, and eight votes were recorded in its support. The original motion also received eight votes; and the Mayor gave a casting vote in favour of the amendment, which was then put as a substantive motion, and carried.

MONTE VIDEO GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Wednesday, at the Cannon Street Hotel, E.C.—Mr. A. K. MACKINNON in the chair.

The SECRETARY (Mr. A. G. Hounsham) read the notice convening the meeting; and the Directors' report and accounts, of which an epitome appeared in the JOURNAL last week, were taken as read.

The CHAIRMAN said it was not his intention on the present occasion to take up much of the shareholders' time, for the report and accounts contained exhaustive details of the Company's affairs. He might briefly summarize their position in a few facts. They brought forward from last year £8027, to which they added in this £443; forming a balance of £8470 towards the revenue of the current year. They had written off £1750 for depreciation of capital account; and were able to declare a dividend of 2½ per cent. for the half year—making, with the like dividend paid last November, 5 per cent. for the year. Considering the acute crisis through which Uruguay had passed, especially during the last two years, when the greatest economy had been

practised by all classes of society, the Directors thought they might congratulate the shareholders on being able to do this out of profit, and still carry forward so substantial an amount towards this year's working. This had been accomplished, he need hardly state, by great and skilful economies carried out at Monte Video, and on this side. He could not say that the crisis was over yet; but it would be readily understood that, with the natural recuperative power of the country, it might not be long before they had a return to prosperity. News recently to hand informed them that the customs receipts had improved; and this, with the increased value of the exports, could not fail to improve the financial outlook, and, let them hope, the prospects of the Company. The decrease in the private consumption of gas, which continued to augment—reaching 14·69 per cent. in April last year on the corresponding period of the previous one—was, he was happy to say, reduced during last March to 6·89 per cent.. By telegram just received, they had the news that this had been brought down to 4·75 per cent. decrease in the month of April last. It was noticeable that, although such extreme economy had been so general among their consumers, the reduction in the number was only 108 last year, or 3·55 per cent. on the total number. In all probability, these represented that impecunious class which, with great facility, "take up their bed" and wend their way to "pastures new." The Company, he said, might well be spared such patronage. The shareholders would remember that, when the Directors announced, on April 1, 1887, the large reduction of 20 per cent. on the price of gas, they naturally looked forward to a corresponding increase in the consumption, which, in fact, was striking in the years 1887-9; and, but for the crisis, no doubt it would have continued to increase, at least in proportion, to this date. The consumers had, however, in the meanwhile largely benefited by this reduction in price. For the six years 1887-92, the saving due to the reduction had been no less than £96,654, or $454,275 gold. The Directors would continue to effect economies where possible—by adopting improvements in the processes, and by increased utilization of the bye-products—and looked forward with hope to a more prosperous future. Principally owing to a diminished consumption of coal, their dock had not given such a good result as in the previous year, although they had 16 vessels to repair, as against 10 in 1891; and the revenue for these was greater by £468. He must not omit to state that the Government departments and the Municipalities continued to meet the current indebtedness for their consumption of gas with regularity. The old debt to June, 1890, belonged to a previous administration; and the Government had included it with other debts of the same period, which now waited for the resolution of the Chambers as to meeting these liabilities. The Company's investments were the same as last year—viz., £10,000 (in each) of India stock, Metropolitan, and Nottingham Corporation 3 per cent. stocks, and the cost price (£6972 8s. 11d.) of two important blocks of buildings. The former were now worth £1526 more than the Company paid for them; and the latter properties were yielding them 6 per cent. interest per annum. To the above amount, they must add $250,320 nominal of the Government 4 per cent. bonds, which returned the sum of £2130 per annum. During the year they had taken up 1·31 miles of mains, and relaid 2·14 miles; the present total mileage being 87·59. The works were in a most efficient state; and they were only waiting for an improvement in affairs (which he trusted was not far distant) to increase the production of gas. He concluded by proposing the adoption of the report and accounts.

Mr. R. MORTON seconded the motion.

The CHAIRMAN, replying to a number of questions, stated that of the reserve fund £51,618 was invested in the securities he had already named; and the small balance was their floating working capital. With regard to the item of gas-fittings (£10,698), he agreed that this was a large amount. But it had continued to be so for some years, owing to the depressed state of affairs in Monte Video; and they hoped that, as things improved, they would be able to move off a considerable part of the stock. They did not loan these fittings out, as was suggested by one shareholder; but they sold them outright. In his opening address, he had given details of the £36,000 they had invested; and with regard to the old Government debt (£5600), a scheme dealing with this and other debts had already been submitted to the Chambers. He did not anticipate that the Company would be paid in gold, but that they would receive, as well as the other creditors, a Government security. With regard to the electric light, he did not think the shareholders need fear they were going to be "snuffed out" by it; but, on the contrary, their revenue was likely to increase, as there were many uses to which gas could be applied, and which would increase the consumption. The item of materials for use (£13,709) included much from which they obtained a revenue, mains, pipes, services, the dock materials, &c. As to the public lighting, there had been an increase in the number of lamps during the past year, but a reduction in the present.

Mr. EDWARDS asked whether the Directors considered it essential, in the present state of affairs, to reserve such a large balance as £8470 of undivided profits. It was much larger than it used to be a few years ago; and one-half of this sum would give the shareholders their former dividend of 6 per cent., instead of 5 per cent., and restore the Company's position on the stock markets.

The CHAIRMAN replied that the balance was kept in hand to meet any contingencies that might arise. When they remembered that, on the opposite side of the river, one Company had paid no dividend and the other had reduced theirs, he thought it ought to reassure the shareholders as to the value of their own property. In answer to a question, as to the concession, he said that it had not been renewed, and that its renewal depended upon certain circumstances. He did not think it would be prudent for the Government to leave Monte Video entirely to the electric light. The total eclipses that had taken place in various parts of the town for some time past could not be a matter of indifference to the Government.

The motion was unanimously carried.

On the proposition of Mr. MORTON, seconded by Mr. DODGSON, the retiring Directors (Messrs. A. K. Mackinnon and T. C. Tatham) were re-elected; and subsequently the Auditors (Messrs. Price, Waterhouse, and Co. and Mr. E. Cheshire) were reappointed.

The usual votes of thanks concluded the proceedings.

METROPOLIS WATER SUPPLY.

The Quality of the Water in the Month of April.

The returns furnished to the Registrar-General by the London Water Companies as to the water supply of the Metropolis during the month of April show that the average daily supply was 193,915,760 gallons, as compared with 180,921,835 gallons in the corresponding month of 1892. The number of services being 793,505, the rate was 244 gallons per service. Of the entire bulk of water sent out, 98,051,897 gallons were drawn from the Thames, and 95,863,863 gallons from the Lea and other sources. Reporting upon the quality of the supply, Dr. E. Frankland said: "Taking the average amount of organic impurity in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health was: Kent, 0·6; Tottenham, 1·0; East London (deep well), 1·1; New River, 1·2; Grand Junction, 1·7; Colne Valley, 1·8; Southwark, 1·9; West Middlesex and East London (river supply), 2·0; and Chelsea and Lambeth, 2·4. The unfiltered river waters exhibited the following proportions: New River cut, 2·0; East London Company's intake, 2·9; and the Thames at Hampton, 3·1. The Thames at Hampton was, on April 5, turbid and very pale yellow. It was, for river water, of very good chemical quality; being chiefly derived from springs in the chalk and oolite. On this account, the Companies having the least amount of storeage—the Southwark and Grand Junction—delivered water of the best chemical quality. Bacterially, the raw Thames water was on April 5 twice as good as on March 20. Contrasted with the raw water, the supplies of the five Companies drawing from the Thames showed the following percentage bacterial improvement: West Middlesex, 99·32; Chelsea, 98·98; Southwark, (No. 1 filter well), 98·3; (No. 2 filter well), 97·05, and (unfiltered gravel water) 98·07; Lambeth, 97·28; and Grand Junction, 96·26. The water was in all cases efficiently filtered. The unfiltered water taken chiefly from the River Lea by the New River Company on April 7 was turbid, but nearly colourless. Both chemically and bacterially, it was not quite so good as on March 22. It was efficiently filtered before delivery, and was then equal to the Kent Company's water in respect of bacterial purity, and nearly equal to deep-well water as regards chemical purity. The raw water taken from the Lea by the East London Company on April 7 was turbid and very pale yellow. Chemically, it was slightly better, but bacterially much worse than raw Thames water at Hampton. After 13·7 days' storeage, it exhibited the same day a bacterial improvement of 82·7 per cent. This water was efficiently filtered before delivery, and was ultimately improved bacterially, on an average, 98·06 per cent. The deep-well waters of the Kent, Colne Valley, and East London Companies and of the Tottenham Local Board of Health were of most excellent quality for dietetic purposes; the Kent Company's water being again distinguished for its very high organic and bacterial purity. The water of the Colne Valley was softened before delivery; and thus rendered suitable for washing. All these waters were clear and bright without filtration. Seen through a stratum 2 feet deep, the Kent, Colne Valley, Tottenham, and East London (deep-well) waters were clear and colourless; and the remaining waters clear and nearly colourless. The bacteriological examination, by Dr. Koch's process, of the raw river and gravel waters and of those supplied by the various Companies, collected on the 5th, 6th, 7th, and 8th of April, gave the results contained in the following table:—

	No. of Microbe Colonies per Cubic Centimetre.		Temperature in Deg. C.
Raw River Waters.			
Thames at Hampton	1763	..	11·6
New River Cut	763	..	12·7
Lea at Angel Road	2579	..	12·5
River Supplies.			
Chelsea	18	..	11·1
West Middlesex	12	..	10·3
Southwark, No. 1 Well	30	..	11·4
" No. 2 "	52	..	11·7
" Unfiltered gravel water	34	..	9·3
Grand Junction, Kew filters	66	..	11·1
Lambeth	48	..	11·4
New River	6	..	12·4
East London, Essex Well, No. 1	44	..	12·0
" " " 2	56	..	12·3
Deep Well.			
Kent	6	..	11·3

Thus, the deep-well water of the Kent Company, as it issued from the pumping-shaft, and the New River Company's water as it left the filters, contained the smallest number of microbes per cubic centimetre; while of the remaining waters examined bacterially, the Chelsea and West Middlesex were the best."

In the course of their report for April to the Official Water Examiner (General A. de Courcy Scott, R.A.), Messrs. Crookes and Odling say: "By reason of the prevailing drought, the condition of the rivers throughout the month of April was exceptionally good; and the river-derived water supply was accordingly noticeable for the exceeding smallness of the proportion of organic matter present therein. Thus, calculated upon the amount of organic carbon found, the mean proportions of organic matter present in the different supplies may be taken as being approximately about one-tenth part of a grain per gallon in the case of the New River Company's water, and about one-seventh part of a grain per gallon in the case alike of the Lea-derived water furnished by the East London Company, and of the Thames-derived water furnished by the other five Companies. As a result, moreover, of the excellent condition of the streams themselves, the difference in quality of the water supplied during the month, by the Companies having a large, and by those having but a small storeage area, was inappreciable. The degree of freedom from

colour-tint of the water, expressed in the case of the Thames-derived supply by the blue-brown ratio 20 : 11·5 as a mean, was, although high, not so high as has been noticed on other occasions of an exceptionally low reduction of the proportion of organic matter present in the water. It is interesting to compare the results afforded by the water supply for April with those afforded by the supply for February, which was an exceptionally wet month, and with the average of those afforded by the supply for the first three months of the year, including February, as exhibited in the following abstract of results obtained with the Thames-derived supplies :—

1893.	Oxygen required for Oxidation. Means.	Organic Carbon per 100,000. Means.	Organic Carbon per 100,000. Maxima.
February. . . .	0·069 ..	0·201 ..	0·269
First three months .	0·059 ..	0·177 ..	0·272
April	0·028 ..	0·088 ..	0·125

It will be noticed that during February, when the river was in a flooded state, and the water supply in a less satisfactory condition than usual, the absolute excess of organic matter present in the supply for that month above the exceptionally small amount present in the supply for April was really very small; amounting, in the case of the Thames-derived supplies taken for illustration, to not more than one-fifth part of a grain per gallon—that is, to less than the 3000th part of 1 per cent. It is further noticeable that, while the mean ratio of nitrogen to carbon in the organic matter of the April supply was found to be as 29 : 100, the mean ratio in the organic matter of the February supply was only as 21·5 : 100—indicating the mainly vegetable origin of the excess of organic matter then present. Indeed, it seems to be an invariable rule that, when the quantity of organic matter present in the water is somewhat above the average, its mainly vegetable character is proportionally more decided."

NORTH SHIELDS WATER COMPANY.

The Annual General Meeting of this Company was held last Wednesday—Mr. SEYMOUR BELL in the chair.

The Directors, in their report (which was taken as read), stated that 67 new services had been laid to supply 75 new consumers. Notwithstanding that the basis of charging water-rates had been changed to rateable value, instead of being, as formerly, on the gross rental, the revenue had increased £454; the total earnings being, in fact, larger than they had ever been before. The gross revenue for the year had been £10,423; and the expenditure, £8589 (including interest on loans, amount paid to the Newcastle and Gateshead Water Company, and the balance of the costs of the Bill in Parliament, unpaid last year)—leaving a profit of £1834. The Directors recommended the payment of a dividend of 3 per cent., which would amount to £1800. His Grace the Duke of Northumberland's one-seventh share of the clear annual profits for the year ending April 30 last came to £463 (payable in September next); and after paying this amount, and adding £50 to the reserve fund, there would remain a balance of £708 to carry forward. The arrangements foreshadowed in the report of last year, for a further supply of water from the Newcastle and Gateshead Water Company, had been completed, and a new main laid. By this supply, they had been enabled to maintain the whole service to the low town district, without encroaching on their resources at the higher level.

The CHAIRMAN, in moving the adoption of the report, said the Company commenced the year under anything but favourable circumstances. Many of their private sources of water had been cut off, either by failure, owing to colliery workings, or condemnation of one kind or another; culminating in the loss of the Shiremoor supply, through the injunction action of the Tynemouth Corporation. In July, 1892, an advertisement appeared in the local papers, signed by the Town Clerk, requesting all persons having reason to complain of the quality or insufficiency of the water supplied to them to communicate with him. Upon that he (the Chairman), with the senior Director and the Clerk, waited upon the Directors of the Newcastle Water Company with the advertisement. They were enabled to show that, if the Newcastle Company could help them, and intended to do so, it must be done at once. The result was an offer from that Company to lay an 8-inch main from Rosehill to Howdon Dene; and they, on their part, decided to lay a similar one to carry the water to their existing main. Last September the works were completed; and to their great satisfaction they found the capabilities of that supply had been under-estimated. They had at first 260,000 gallons; and they had had as much as 400,000 gallons per diem through it. The supply to the district had been and would be maintained. The consumption per head had averaged 17·47 gallons daily throughout the year. With regard to the revenue, it must be highly satisfactory to the shareholders to observe the elasticity and recuperative power shown by the income of the Company. By the action which decided that they must charge for their water upon the net instead of the gross annual value, they stood to lose something like £1200 per annum, or 2 per cent. on their capital had all consumers been rated on their gross value. The Company adopted the rateable value as a fair basis for charge, and it had met with general approval; while by the re-adjustment, coupled with a steady influx of new customers, the lost revenue referred to had been converted into an increase of about £200 a year. They were, therefore, in a better condition, so far as revenue was concerned, than they occupied twelve months ago; and, had it not been for exceptionally heavy expenses, the proprietors would now have been asked to vote a dividend of 4 instead of 3 per cent.

Mr. B. WILLIAMSON seconded the motion; and it was carried.

The dividend recommended was then declared; and the proceedings closed.

New Tar-Tanks at the Bradford Gas-Works.—At a specially-convened meeting, the Bradford Town Council recently accepted a tender by Messrs. H. Birkby and Sons for the construction of tar-tanks at the Valley Road Gas-Works, for £4295. A tender for £3750, previously recommended by the Gas Committee for acceptance, could not be proceeded with by the contractor.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Edinburgh and Leith Gas Commissioners on Monday discussed a matter which, though it may appear on the surface to be one of book-keeping only, when looked into is found to have a deeper significance. The question was what value should be put on the stock of coal on hand; and it seems to be one to which the Commissioners have not during the period of their existence—now nearly five years—required to apply themselves. It has arisen in consequence of the great fall in the price of coal. When considered by the Finance Committee, that body resolved to recommend that the value should be the prices paid, less one-half of the reduction at this time. Mr. Kinloch Anderson in the Commission moved disapproval of that, and that the value should be the present market value. There was a good deal of discussion; and then Mr. Anderson's motion was adopted by 14 votes to 3. Mr. Anderson's reasoning was that, to insert the coal in the balance-sheet at the price paid for it, which was considerably higher than it would now fetch, would lead to the inflation of the income side of their accounts by about £2000, upon which they would have to pay income-tax; and I suppose he meant that, instead of being a gain to the Commissioners, the £2000 had actually been a loss. That view is quite correct; and Mr. Anderson's plan would work well always when there was a fall in the price of coal. The difficulty would come in when coal rose in price after it was delivered. The Commissioners would then actually, for market purposes, earn a revenue upon it; and to exclude that increment from the stock account would mean the depreciation of their general revenue for the year. The view of the minority was nonsense, inasmuch as it implied a half measure. They proposed to spread the effect of the fluctuation in price over two years. Such a course might be right if it were the recognized policy of the Commissioners, applicable to all years, in which event there would require to be a coal account, with allowances for depreciation or appreciation, according to circumstances. But such a scheme might not work, because it would be a constant disturber of the annual balance-sheet; and besides, before any such scheme could be adopted, it would require very careful consideration. Any way, it was not a proper course to adopt without much consideration. The question is complicated by the fact that the Commissioners do not purchase coal to hold against a rise or fall, but for gas making; and whether the price goes up or down, the coal is of the same value to them—barring, always, the consideration of how it may affect the price of gas and consequent general revenue. It is not for me to get the Commissioners out of a difficulty; but it seems that they have got out of it in the meantime in the only way practical, because time was pressing, as the balance-sheet was waiting to be made up. If they wish to fix a policy with finality in it, they will have sufficient opportunity to mature a scheme in the course of the current year.

Another subject which was before the Commissioners related to the value of residuals in the event of oil enriching being introduced. Messrs. J. Ross and Co., of Falkirk, are the contractors for the residuals; and their contract expires at the end of this month. They wrote stating that they had doubt as to whether the new process of oil-gas manufacture, which they thought it highly probable the Commissioners would adopt, would not, by reducing the quantity of the better-class coal used, lower the quality of the residuals. They asked to have an interview with the Engineers on the subject, which no doubt will be granted.

I am sorry to say that Mr. Linton, the Engineer of the Leith Gas-Works, is so unwell as to be unable to attend to his duties. He has been suffering for a considerable time from a severe attack of catarrh of the stomach. At the meeting of the Edinburgh and Leith Gas Commissioners on Monday, a letter from Mrs. Linton was read asking leave of absence for her husband. This was at once accorded; and Mr. Walker, the principal assistant, was appointed to take charge of the works in the meantime. The latest report I have is that Mr. Linton is improving. It is unfortunate that he should be laid aside this summer, because his presence would have been valuable at the North British meeting, where there will be so much to say about oil gas.

This leads me to state that the Committee of the North British Association have been to Peebles, to see Mr. Young's process at work. Their opinions as to the value of the process have not been divulged, and may not be known till the North British meeting at Dundee next month. Mr. M'Gilchrist, of Dumbarton, who was one of the visitors, has been back to Peebles since; and he is now, at the request of his Committee, preparing a report to them upon the process. On the occasion of his visit last Saturday, a most interesting experiment was in progress, consisting of the employment in the plant of the oil which is recovered in iron-works. The oil is not a very rich product; and if this outlet were obtained for it, it would remove a difficulty which is at the present time experienced in its disposal. I understand that the yield from this oil is not so good as from paraffin oils. No one would expect it to be so; but it might, on that very account, be a more valuable enricher in certain circumstances than a better-class oil. For instance, an oil gas of 90-candle power, if added to coal gas in greater proportion than one-fifth, would raise the illuminating power of the mixture to more than 30 candles, which is not desirable. If, however, an oil could be found which would produce only 60-candle power gas, more of it could be used for enriching; and if made in the neighbourhood of an iron-works, the gas sent out would be consumable in ordinary fittings, and would be amazingly cheap. Coatbridge is a good illustration of this. There the gas-works are so situated that the oil could be pumped right into them; and the cost would be somewhere about ¼d. per gallon. Gas produced from material at that price would be a long way cheaper than can be got from coal alone; and yet in Coatbridge an electric lighting company has taken off ground upon which to erect an installation. At what price will they require to sell electricity, in order to compete with oil gas so produced?

Mr. A. Scott, of Galashiels, has completed and brought into use the oil-gas plant which he has erected on the Peebles system. This is the first installation outside the Peebles works. I understand that

Mr. Scott is delighted with the working of it, and particularly—there not having been time yet to record results—with its automatic working. He can, for instance, go to bed at night, and in the morning find that his holders have risen wonderfully, without any trouble, except a little attention to the fire now and then. He made no announcement of the turning on of the plant; and the first intimation which the community had of it was when they observed the improved illuminating power of the gas. Mr. Scott had 60 retorts in the works. Twelve of these have been converted into oil retorts; and a new feature has been introduced in the heating. The bench is a double one; and the oil retorts are heated by the spent heat from the coal retorts on the other side. This is found to be quite sufficient for the low heat which is required for working with oil. The coal retorts have been, and are, fired by a regenerative system which is Mr. Young's invention. Furnaces have been introduced into the ovens in which the oil retorts are, which can be lighted up if occasion should require it; but they have not yet been required to be used. So far, the working of the two plants together has given the utmost satisfaction. The oil plant has cost about £1000. Your readers will have some understanding of what that means when it is stated that in Galashiels the annual output is about 60 million cubic feet per annum. Twelve million cubic feet of gas a year for a capital expenditure of £1000, is a good return. It has, however, to be recollected that no new outlay is required for purifiers or gasholders. In fact, owing to the concentrated nature of the oil gas, there is, light for light, less purifier and holder accommodation required than with coal gas; and there will be a saving on that head to gas-supplying bodies. A cognate saving will be found in places where the gas consumption has increased till the limit of capacity of the mains is about reached, and where a great expenditure upon enlarged or new mains would require to be faced. In such places the use of oil gas will enable them to go on for years without that outlay. In Galashiels the works are close to the railway, and at a lower level, which permits of the oil being run by gravitation from the railway tank-waggons into the cistern in the works. A three years' contract for oil has been entered into with Young's Paraffin Light and Mineral Oil Company, which is managed by Mr. Fyfe—the gentleman at whose instigation, it will be remembered, Mr. Young undertook to investigate into the subject. The present price of gas to householders in Galashiels is 3s. 9d. per 1000 cubic feet; and it has been the custom to supply it at from 28 to 29 candle power. The mixed gas is of from 32 to 33 candle power; and it has been calculated that it gives an advantage to the consumer which is equal to 2½d. per 1000 cubic feet. There will in all likelihood be a reduction in the price intimated at the annual meeting.

The Corporation of Glasgow have resolved to give the Lowe system of carburetting gas a trial; and plant of the capacity of one million cubic feet is being put down at the Temple Farm works, beside Dawsholm, by Messrs. Humphreys and Glasgow, of London. The city, as is well known, is subject to sudden fogs; and the plant will be a valuable addition to the works, as it will enable the holders to be kept up at a time when there is a heavy drain upon them. The new plant will be contiguous to the new large 6-million gasholder which is being erected. This is another development of the oil-gas problem. Glasgow I look upon as the only city in Scotland where such plant as the Lowe is of much value. It is the only place of sufficient size to produce coal gas enough to keep a Lowe plant in constant use; and it is the only one where fogs are frequent and sudden. For all other works, what is wanted is a continuous enriching process; and in Scotland there is a general consensus of opinion that such a process is found in the Peebles plant, which is capable of application to even the smallest works.

In Glasgow, the Corporation have just settled a claim for damages which was made upon them in connection with the recent extension of their Tradeston gas-works. In order to provide a continuous yard, it was necessary to close up a portion of Lilybank Road, one of the accesses to the Etna Foundry, belonging to Messrs. Watson, Gow, and Co., who, on the allegation that the closing of it up had led to the damaging of their business, raised a claim for £10,000. The subject was sent to a Special Committee for consideration, with a view to settlement; and it has been compromised, without litigation, for £4000. This is probably a large price; but it was certainly better to get it out of the way than to go to law over it.

The Hamilton Town Council on Thursday fixed their coal contracts for the current year, at a reduction in price of 5s. 6d. per ton. This is expected to lead to a saving of £1000 during the year, which will more than compensate for the diminished revenue from residuals last year—the price of which fell from 9s. 3d. to 3s. 7d. per gallon.

The accounts of the Dundee Gas Commission for the past year have been made up. The revenue was estimated a year ago at £93,299; and the actual receipts were £92,263. Of this amount, £85,321 was derived from gas sold; £6337 from residuals; £2922 from meter-rents; and £1226 from coke. The output of gas was 502,954,600 cubic feet, of which 5,473,900 cubic feet were consumed at the works, and 42,647,350 cubic feet, or 8·479 per cent., were unaccounted for. The expenditure was estimated at £93,029; and the actual amount was £92,010. Of that, the cost of coal is represented by £40,080. This gives some idea of the fall in the price of coal, for in the preceding year the coal account was £53,644. There is a surplus upon the past year's working of £253. For the current year the Finance Committee have adopted estimates which show an expected output of 500 million cubic feet of gas. They propose to grant the substantial reduction of 5d. per 1000 cubic feet, making the price of gas 3s. 4d.; and they estimate a net income from gas of £74,519, and a gross income, from all sources, of £82,246. The expenditure they estimate at £81,146; and they bring out an expected surplus of £1100. The unaccounted-for gas has gone down—it having been about 10 per cent. last year.

Mr. G. T. Myers, whose engagement as Manager of the Broughty Ferry Corporation Gas-Works came to an end on Wednesday, was on Thursday night entertained to supper by a number of his friends. Several of his professional brethren were present, among whom were Mr. J. M'Crae, Mr. R. S. Carlow, and Mr. T. D. Hall. After Mr. Myers's health had been pledged, he was presented with a gold albert with an appendage, on which was an inscription stating that it was given to him by a few friends on his retiring from the managership of the Broughty Ferry Gas-Works, after a service of nearly 40 years.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *June* 3.

Sulphate of Ammonia.—Quite contrary to the usual practice, the month has opened exceptionally firm; and prices are steadily advancing. The London market is especially strong; and official quotations have been raised about 10s. per ton. At Hull, Leith, and Liverpool there are now buyers at £12 to £12 2s. 6d.; but it is a question whether anything can be bought below £12 5s. Orders are now plentiful, both for prompt as well as July-August delivery; and the scarcity of supplies is severely felt. The unprecedentedly strong position of the market is causing anxiety to consumers; and upon the strength of orders to come, speculators are picking up forward contracts in the neighbourhood of £12 f.o.b. It is generally thought that prices will advance very considerably during the next few weeks. Nitrate is unchanged.

LONDON, *June* 3.

Tar Products.—Notwithstanding the diminished production, which is now practically at its minimum, this market is as dull and depressed as it can possibly be. Benzols are quoted a shade higher; but no important business is reported at the advanced prices. Pitch and anthracene are dull; and carbolic acid is also weak and difficult to sell. Creosote, salts, and tar oils have never been known to be so low as they are just now. The enormous quantities of blast-furnace oil coming from Scotland is seriously damaging the sale of the English products. One or two important tar contracts have been let at prices ranging from 10s. to 12s. 6d. per ton. The nominal prices of other products are: Pitch, 23s. to 24s. Benzols, 90's, 1s. 6d.; 50's, 1s. 5d. Solvent naphtha, 1s. Toluol, 1s. 4d. Crude benzol naphtha, 30 per cent., 7d. Creosote, 1d. Creosote salts, 17s. Carbolic acid, 60's, 2s. 1d.; 70's, 2s. 6d.; crystals, 7d. Cresol, 1s. 9d. Anthracene, nominal, 30 per cent., "A," 1s.; "B," 8d.

Sulphate of Ammonia.—A decided improvement has set in in this article; and the price during the week has advanced from £11 10s. to £12 2s. 6d., less 3½ per cent., at which latter price there are numerous buyers. It is rumoured that the "bear" operators in this market have been caught to a pretty tune. Gas liquor, 10 oz., is quoted at 7s. 6d. to 8s. 6d.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—The protracted holiday stoppages of the pits have had no appreciable effect in diminishing the excessive supplies of round coal offering in the market; and comparatively very little stock has been filled up at the collieries to meet the requirements of customers during the holidays. There has been no quoted change in list rates with the commencement of the month; and for the better qualities of round coal, prices have been fairly maintained at recent minimum rates. Best Wigan Arley averages 11s. to 11s. 6d.; Pemberton four-feet and second qualities of Arley, 9s. 6d. to 10s.; and common house-fire coals, about 7s. 6d. to 8s. per ton at the pit mouth. For special sales, however, less even than these figures is in many cases being taken. With regard to gas coals, there is perhaps increasing keenness in the competition to secure contracts; and, generally speaking, it may be said that tenders have little chance of acceptance unless they are based on quite 1s. per ton under last season's prices; while in some instances eager sellers are quoting 1s. 6d. per ton under the rates that were paid last year. There is so wide a margin in the figures now being quoted on tenders, that it is difficult to give anything like an average price; but screened gas coal may be said to range from 7s. 3d. and 7s. 6d. for the common qualities, up to 8s. 3d. and 8s. 9d. for the best descriptions of screened Wigan gas coal at the pit mouth. Common round coals continue so complete a drug that all sorts of prices are being taken to secure orders; and they can only be quoted from about 6s. per ton upwards, the Railway Companies having been able to buy readily coal suitable for locomotive purposes at 6s. 3d. per ton. The shipping trade remains without improvement; and steam coal continues to be offered at about 7s. 6d. to 8s. per ton delivered at the ports on the Mersey. Supplies of engine fuel become, if anything, still more scarce, owing to the very limited output of slack; but there is no actual advance upon late rates, except where outside buyers have to pay special prices to secure supplies. Burgy is fetching 6s. 3d. to 6s. 9d.; best slack, from 5s. 3d. to 5s. 9d.; and common sorts, from 3s. 9d. to 4s. 6d. per ton at the pit mouth.

Northern Coal Trade.—The coal trade is rather easier this week, some of the most pressing orders for the Baltic having been got away. Still, the chief collieries engaged in the steam coal trade are fully at work, though the turns are not quite so long as they have been. Best Northumberland steam coals are in good demand; and, with large shipments, the prices are fairly maintained—ranging from 8s. 6d. to 8s. 7½d. per ton f.o.b. For second-class coals, the demand is not quite so good; and though 8s. per ton is still asked, a little discount is in some cases allowed. Gas coals are now in rather fuller request. It is not so much that the inland consumption has increased, but that there is a larger demand for shipment. Prices of best Durham gas coals are on the basis of from 6s. to 6s. 3d. per ton f.o.b.—a very low price. There is very little alteration in the position of coal for manufacturing purposes. For coke there is a decided increase in the demand, especially for the furnaces of the North-west. For export, the price ranges from 13s. 6d. to 14s. per ton f.o.b. in the Tyne or at West Hartlepool. Gas coke is still quiet, and some of the companies have heavy stocks; but, with a minimum make, these should decrease in the course of a few weeks.

Scotch Coal Trade.—There is little change to speak of in the trade in Scotland. A few extra shipments to Baltic ports have given some colour to a supposed improvement; but it is very slight. The most hopeful feature is that iron and steel works are keeping going pretty well; but with regard to them the fear is beginning to be entertained that there will soon be an overstocking of the market. The miners are working at the reductions recently imposed. Most of them are getting but four days a week, though some are said to be working five. The

idle days are spent in the holding of meetings, at which a restrictive policy is being largely advocated—a circumstance which does not as yet affect the coalmaster, because he finds no difficulty in supplying demands. Prices are practically unaltered, and are given as follows: Main, 5s. 7d. to 5s. 9d.; ell, 6s. 6d. to 7s.; splint, 6s. to 6s. 3d.; and steam, 7s. 9d. to 8s. per ton f.o.b. Glasgow. In the gas coal trade, it is beginning to be realized that consumers are going in more and more for ordinary coal and shale, and leaving cannel alone. Oil enriching is also telling on the market, more by anticipation than in reality. It is stated that, though there is much inquiry for coal for gas making, comparatively few contracts are being entered into; the intention being apparently to call for tenders again, after tiding over a while with last year's undelivered supplies, and perhaps making a few small purchases. The shipments during the past week amounted to 142,642 tons—an increase upon the quantity in the previous week of 3201 tons, but a decrease as compared with the corresponding week of last year of 37,089 tons. For the year to date, the total shipments have been 2,532,520 tons—a decrease on the quantity in the same period of last year of 302,915 tons.

The Cost of Lighting Liverpool.—According to a return, prepared by direction of the Finance Committee of the Liverpool Corporation, showing the expense involved in lighting the city during the past twelve years, the amount spent has risen from £29,140 in 1881 to £41,920 in 1892; while the estimate for this year is £42,475. The great advance was from 1881 to 1883; and it was due to the introduction of court lighting. For the past five years there has been an increase of about £1200, owing to the greater number of lighting hours; while two years ago the advanced price of gas caused an increase of £1500 in the lighting charge.

Inclined Retorts at Leigh.—The contracts for the extension of the inclined retorts at the Leigh Gas-Works (Mr. A. T. Fletcher, Engineer) were settled at a meeting of the Local Board last Tuesday evening. Messrs. Jonas Drake and Sons are to supply the settings, brickwork, and furnaces; Messrs. W. C. Holmes and Co., the ironwork and tanks; and the New Conveyor Company, Limited, the coal breakers, conveyors, and elevators, and the coke tanks, elevators, and conveyors, with all the gearing. The coke-handling plant is considered somewhat unique, as it enables the attendant to fill the trucks or carts automatically from the storeage hoppers, by simply turning a hand-wheel which opens the doors for the outflow of the coke. The conveyors and elevators are all to be of the latest form of compressed steel chain, with seamless stamped steel buckets.

The Liability of Sulphate of Ammonia Stills for Excise Duty.—At the end of October last year, the case of *Sidgwick v. Sunderland Gas Company* came before Justices Mathew and Bruce, in the Queen's Bench Division of the High Court of Justice. It arose out of an action brought by the Inland Revenue authorities against the Sunderland Gas Company, to test the question of the liability for the payment of Excise duty on the stills for the manufacture of sulphate of ammonia. After some discussion between their Lordships and Counsel (as reported in the JOURNAL for Nov. 1), the case, which had been stated by the Justices of Sunderland, was sent back to them, in order that they might state it more fully, and, if necessary, take further evidence as to the nature of the process conducted. The matter again came before Justices Mathew and Wright yesterday, when Mr. Moulton, Q.C. (with whom was Dr. Blake Odgers), representing the defendants, stated that the Justices had heard further evidence; and, in consequence, they had made certain additions to their case. Upon those additions, they were informed by the Counsel for the Crown that they did not intend to proceed any further. He had, therefore, simply to ask for judgment for the Gas Company, with costs. He thought, under these circumstances, they were entitled to the costs of the former and present hearing (for they had only a few minutes previously been informed that the Crown was not going on), and also the costs of the further hearing before the Justices. Justice Mathew inquired if the Crown was represented; and, on receiving a reply in the negative, he said there would be costs accordingly.

Sales of Shares.—The shares and debentures for which the Directors of the *Croydon Gas Company* recently invited tenders in the JOURNAL were disposed of on the 31st ult. The 500 ordinary £10 shares realized an average price of £22 3s. each; and the £5250 of 4 per cent. debentures, an average of £104 13s. 9d. per £100.——The sale of the 1750 shares in the *West Ham Gas Company* which has been advertised in our columns for the last few weeks took place at the Mart, Tokenhouse Yard, last Tuesday—Mr. Alfred Richards being, as before, appointed by the Directors to conduct the sale. The competition was exceedingly keen for the different lots; and the whole of the shares were disposed of at prices ranging from £10 12s. 6d. to £11 5s. each. The total amount realized was £18,685.——Messrs. Nicholson and Co. lately sold, at Sheffield, some stock of the *Sheffield Gas Company*—£140 of "A" stock at 224 per cent., and £17 of "C" stock for £40.——Messrs. N. Easton and Son, of Hull, a few days ago sold some shares and stock in the *Gainsborough Gas Company*. They were £20 shares; £16 ranking as dividend, and £4 paid in advance at 5 per cent. The shares fetched £39 12s. 6d. each; and £100 of original stock was sold for £222.——On Monday last week, Messrs. Force and Son sold by auction 500 ordinary £10 shares in the *Exeter Gas Company*. For the first lot of ten shares, £14 5s. per share was realized; and subsequent lots brought from £14 7s. 6d. to £14 10s. per share—the last lot fetching £14 15s. per share.——Last Wednesday, Messrs. Tootell submitted a number of shares in the *Faversham Gas Company* for public competition, with the following results: Three £100 shares realized £145 each; and a fourth, £146. Nine £50 shares fetched £72 10s. each; three £25 shares, £36 10s. each; and a fourth, 5s. less. A £10 share was disposed of for £14 5s. On all this stock a dividend of 6 per cent. has been paid.——On Thursday, four lots of £100 stock in the *Maidstone Gas Company* (on which an interim dividend of 5 per cent. has already been paid this year) were sold by auction—one for £205, two for £204, and one for £204 10s. respectively. Nine lots of £50 realized an average of £102 10s. each; and a single £24 lot produced £51 10s.

Accident at the West Surrey Water-Works.—Last Wednesday a distressing accident took place at the works of the West Surrey Water Company, when an engine driver named Lionel Bailey had his right arm crushed to a pulp in the machinery. It appears that the unfortunate man (who is married, and has six children to support) was wiping one of the crank cheeks—a task which he had performed many hundreds of times—when by some means his arm caught in the machinery. He managed to extract the injured limb; and one of his fellow-workmen, named Budd, who had been in the Navy, where he learnt ambulance work, bound it up. Bailey was afterwards conveyed to the Royal Surrey County Hospital, where it was found necessary to amputate his arm.

A New Gasholder for Cardiff.—Owing to the increase in the consumption of gas in Cardiff, the Directors of the Gas Company have found it necessary to erect a new gasholder at their Grangetown works; and the ceremony of laying the first brick of the tank was performed by the Chairman (Mr. C. H. Williams) last Thursday. This tank, when completed, will be the largest in South Wales; the diameter being 152 ft. 6 in., with a total depth of 37 ft. 6 in. A sump well has been sunk to a depth of 52 feet; and powerful rocker pumps have been fixed, driven by portable engines working both day and night, to keep the excavation free from water during the progress of the work. The trench, which is about 15 feet wide, has been excavated to a depth of 36 ft. 6 in. At the bottom, an 18-inch layer of clay puddle is placed, on which 4-inch elm planking is laid; and on this the brick wall in lime mortar will be erected. There will be built in the wall, at equal distances, 16 piers, 6 ft. 6 in. square, to receive the gasholder columns. The main wall at the bottom is about 4 feet thick reducing to 2 ft. 4 in. at the top, with Forest of Dean stone coping. When the wall is completed, the ground inside the tank will be excavated; and the bottom covered with 18 inches of clay puddle. This is to be afterwards covered with 12 inches of cement concrete; thus forming the floor of the tank. The puddle is also extended up the back of the walls to its full height. Considerably over a million bricks will be required for the work; and something like 4500 cubic yards of clay puddle. The capacity of the holder will be about 1,660,000 cubic feet. The work has been designed, and is being carried out, under the supervision of Mr. Henry Morley, the Company's Engineer, by Messrs. John Aird and Sons.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 1039.)

Issue.	Share	When ex-Dividend	Dividend or Div'd & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	13 Apl.	10⅜	Alliance & Dublin 10 p. c.	10	17—18	..	5 16 8
100,000	10	,,	7⅜	Do. 7 p. c	10	12—13	..	5 15 5
300,000	100	3 Jan.	5	Australian (Sydney) 5 % Deb.	100	104—106	..	4 14 2
100,000	20	31 May	8	Bahia, Limited	20	10½—11⅝*	..	13 18 3
200,000	5	12 May	6½	Bombay, Limited	5	5⅛—6	..	5 8 4
40,000	5	,,	6½	Do. New	4	3¾—4¼	..	6 2 6
380,000	Stck.	24 Feb.	11½	Brentford Consolidated	100	217—222	+1½	5 3 7
180,000	,,	,,	8½	Do. New	100	168—173	..	4 18 3
220,000	20	15 Mar.	11½	Brighton & Hove Original	20	41—43	..	5 6 11
888,500	Stck.	31 Aug.	5	Bristol	100	104—107	..	4 13 5
320,000	20	13 Apl.	11¾	British	20	42—14	..	5 4 7
50,000	10	15 Mar.	11½	Bromley, Ordinary 10 p. c.	10	19—20	..	5 15 0
51,510	10	,,	8½	Do. 7 p. c.	10	14½—15½	..	5 9 8
328,750	10	—	—	Buenos Ayres (New) Limited	10	5¾—6½	..	—
200,000	100	3 Jan.	6	Do. 6 p. c. Deb.	100	97—100	..	6 0 0
150,000	20	24 Feb.	8	Cagliari, Limited	20	25—27	..	5 18 0
550,000	Stck.	28 Apl.	12½	Commercial, Old Stock	100	243—248	..	5 0 10
165,000	,,	,,	9½	Do. New do.	100	182—187	..	5 1 7
160,762	,,	15 Dec.	4½	Do. 4½ p. c. Deb. do.	100	127—132	..	3 8 2
800,000	Stck.	15 Dec.	13	Continental Union, Limited	100	230—235	−2	5 10 8
200,000	,,	,,	10	Do. 7 p. c. Pref	100	192—197	..	5 1 6
75,000	Stck.	15 Mar.	10	Crystal Palace District	100	187—192	..	5 4 2
486,090	10	27 Jan.	10	European, Limited	10	21½—22½	..	4 8 11
354,060	10	,,	10	Do. Partly paid	7½	15—16	...	4 13 9
5,596,560	Stck.	10 Feb.	12	Gaslight & Coke, A, Ordinary	100	215—220	..	5 9 1
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	95—99	..	4 0 10
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	263—268	..	3 14 7
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	120—125	..	4 0 0
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	170—175	..	4 5 8
1,300,000	,,	,,	7	Do. H, 7 p. c. max	100	169—174	..	4 0 5
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	260—265	..	3 15 6
476,000	,,	,,	6	Do. K, 6 p. c. Prf.	100	156—160	..	3 15 0
1,061,150	,,	15 Dec.	4	Do. 4 p. c. Deb. Stk.	100	124—128	..	3 2 6
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	130—134	..	3 7 2
908,000	,,	,,	6	Do. 6 p. c. do	100	169—172	..	3 9 4
3,800,000	Stck.	12 May	12	Imperial Continental	100	217—221	+1	5 8 7
75,000	5	30 Nov.	6	Malta & Mediterranean, Ltd.	5	5 5⅛	+⅛	5 9 1
560,000	100	4 Apl.	5	Met. of Melbourne, 5p. c. Deb.	100	103—105	..	4 15 3
541,920	20	16 Nov.	5	Monte Video, Limited	20	13½—14½	+⅛	6 18 0
150,000	5	31 May	10	Oriental, Limited	5	7⅞—8⅛	..	6 5 0
60,000	5	29 Mar.	7	Ottoman, Limited	5	4¼—4⅜	+¼	7 3 8
166,870	10	—	2	Pará Limited	10	1¾—2¼	..	—
420,000	100	2 May	6	People's Gas of Chicago—1st Mtg. Bds.	100	100—105	..	5 14 3
500,000	100	1 June	6	2nd Do.	100	98—102	+½	5 17 8
150,000	10	28 Apl.	5	San Paulo, Limited	10	8—8⅛	−¼	5 17 8
500,000	Stck.	24 Feb.	15½	South Metropolitan, A Stock	100	294—299	..	5 3 8
1,350,000	,,	,,	12	Do. B do.	100	244—248	..	4 16 9
830,000	,,	,,	13	Do. C do.	100	245—255	..	5 1 11
750,000	,,	13 Jan.	5	Do. 5 p. c. Deb. Stk.	100	148—152	..	3 5 9
60,000	Stck.	15 Mar.	11½	Tottenham & Edm'nton, "A"	100	225—230	..	5 0 0
				WATER COMPANIES.				
744,897	Stck.	30 Dec.	10	Chelsea, Ordinary	100	263—268	..	3 14 7
1,720,252	Stck.	29 Mar.	8	East London, Ordinary	100	208—213	..	3 15 1
544,440	,,	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	142—145	..	3 2 1
700,000	50	15 Dec.	8½	Grand Junction	50	110—113	..	3 15 2
708,000	Stck.	10 Feb.	11	Kent	100	280—285	..	3 17 2
1,043,800	100	30 Dec.	9½	Lambeth, 10 p. c. max.	100	240—245	..	3 17 7
406,200	100	,,	7⅜	Do. 7½ p. c. max.	100	199—204	..	3 14 0
310,000	Stck.	29 Mar.	4	Do. 4 p. c. Deb. Stk.	100	129—133	..	3 0 7
500,000	100	10 Feb.	12½	New River, New Shares	100	329—334	..	3 12 8
1,000,000	Stck.	27 Jan.	4	Do. 4 p. c. Deb. Stk	100	133—137	..	2 18 5
902,300	Stck.	15 Dec.	6½	S'thwk & V'xhall, 10 p. c. max.	100	158—162	−2	3 19 9
126,500	100	,,	6½	Do. D 7½ p. c. do.	100	145—150	..	4 6 8
1,155,066	Stck.	15 Dec.	10	West Middlesex	100	257—262	−3	3 16 3

*Ex Div.

New Water-Works for Tredegar.—At a special meeting of the Tredegar Local Board last Tuesday, tenders were opened for the construction of new reservoirs and the laying of 2½ miles of pipes. There were six tenders—the highest being for £22,549; the lowest, for £18,951. This was accepted. It was sent in by Mr. T. Goldsmith, of Newport. There were ten tenders for supplying the pipes; and the contract was entrusted to Messrs. Spittle and Co., of Newport. The tenders were opened in the presence of Mr. Tegarman Rees, the Board's Water-Works Engineer.

Exhibitions of Gas Appliances.—Exhibitions of gas appliances have recently been held by the following firms: The Davis Gas-Stove Company, Limited, at Burton-on-Trent, Canterbury, and Royston, with the assistance of Mrs. Springthorpe, Miss Edden, and Miss Johnston for the lectures on cookery; Messrs. Fletcher, Russell, and Co., Limited, at Bexley Heath, Clifton, and Hereford, with Miss Virtue and Miss Garston as lecturers at the two last-named places; and Messrs. W. Parkinson and Co., at Smethwick, Miss Thwaites giving cookery lectures and demonstrations twice daily; Messrs. J. Wright and Co., Limited, in Edinburgh, with the assistance of Mrs. Thwaites; and Messrs. Richmond and Co., in Dundee, with lectures by Miss Leng.

The East London Water Company and their Consumers.—At the Thames Police Court last Friday, Mr. G. Kebbell, Solicitor to the East London Water Company, attended before Mr. Dickinson and stated that, since the last time he made his application in that Court for summonses against persons who had neglected to pay their water-rates (*ante*, p. 1010). the Directors had considered the matter, and also the view expressed by his Worship; the result being that they did not now ask for summonses against persons for the payment of water-rates in advance. He would take the opportunity of pointing out that the summonses applied for were against persons who had been consuming water for upwards of five months; so that it could hardly be termed a rate in advance. In fact, in another three weeks not a penny of it could be so termed. Mr. Dickinson said he quite approved of the action of the Company; and added that they were clearly entitled to ask for payment of the rate in advance. People who consumed water ought to pay; and if they would not, he would at once grant summonses against them. He considered that the Company had acted most judiciously in not asking for the payment in advance. Mr. Kebbell said they did not ask for each quarter's rate, but expected it to be paid half yearly. The difficulty they would now have to meet would be the six months' limit question; but they would face this when it arose.

The Proposed Increase in the Price of Gas at Darwen.—A meeting of the Gas Committee of the Darwen Corporation was held yesterday week to receive a report from the Gas Sub-Committee, who recommended that the price of gas be increased 3d. per 1000 cubic feet. The Chairman (Mr. Davies) moved the rejection of the recommendation. Mr. Halliwell, however, moved a direct negative; and a long discussion followed. Ultimately Mr. Halliwell's amendment was lost, and consequently the price of gas will not be increased.

The Charge for Water to Houses in the Hands of Caretakers.—At the Penge Petty Sessions last Tuesday, the Lambeth Water Company were summoned by Mr. A. B. Frend, of Bloomsbury Mansions, for having cut off the water supply to the premises No. 4, Thicket Road, Anerley. Mr. Langton said his client was the owner of the house in question, which had been for some time, and was still, to let; but it was in charge of a caretaker, who occupied one room, for which he paid no rent. Notwithstanding this, the Company demanded £2 2s. for one year's water-rate. Mr. Frend refused to pay more than 20s. per annum; and on April 12 the water was cut off. Previous to that the complainant had written to the Company, asking them what power they had to demand the £2 2s.; and they replied that they were entitled to charge £5 10s. 1d., the rateable value of the house being £73 per annum. Mr. Frend thereupon said he should be pleased to try the question; and he invited the Company to summon him. Instead of doing so, however, they cut off the water. Mr. Bodkin, who represented the Company, said that, strictly speaking, if a house was occupied by any person the water-rate was payable; but the Company, taking into consideration the fact that not so much water was consumed, made a uniform charge of 10s. 6d. a quarter in the case of caretakers. The fact of their claiming the smaller sum did not destroy the power they possessed. Mr. Langton said his case was that, if no poor-rate could be claimed, no water-rate could be demanded. Mr. Bodkin said this was unfounded. The word "rate" as applied to water was a misnomer, as it was money paid for a manufactured article. The Chairman (Mr. J. Judd) said it seemed, according to the Act of Parliament, that the charge for water was settled very definitely, and that was on the rating principle; and that, if a house was occupied by anyone, the Company had a right, upon the rateable value, to demand a certain amount of money. The Magistrates were unanimously of opinion that the complainant must be nonsuited. The summons was then dismissed; and, on the application of Mr. Bodkin, five guineas costs were allowed.

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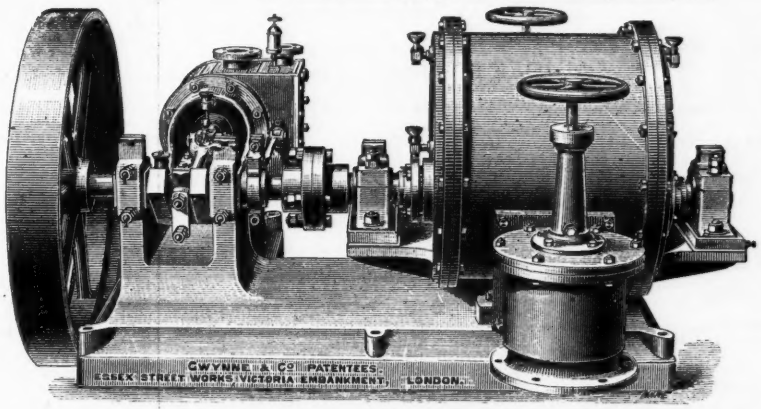

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*** See Advertisement p. II., centre of JOURNAL.
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Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

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WANTED, a Junior Assistant, who has been trained in the Laboratory, and is thoroughly qualified in making Coal and Gas Analysis, Photometry, &c.

Applications, stating Qualifications, Experience, and Salary required, to be addressed to J. Hepworth, Gas-Works, Carlisle.

WANTED, a thorough practical Mechanical Engineer as WORKS FOREMAN at large Provincial Gas-Works. One with knowledge of Gas Apparatus preferred. Wages commencing at 55s. per week.

Apply, giving full particulars of experience, references, &c., to No. 2243, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, by a Gas Engineer in Westminster, a Young Man from 20 to 30 years of age as CLERK and BOOKKEEPER. One accustomed to keeping a Gas Company's Accounts preferred. Wages, paid weekly, 30s. to 50s. (thirty to fifty shillings), according to ability and experience.

Apply, in own handwriting, forwarding *copies* of testimonials, to No. 2242., care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

DALTON-IN-FURNESS DISTRICT LOCAL BOARD.

ASKAM GAS-WORKS.

THE Board require a Man to take charge of a small Country Gas-Works, making about 1 million cubic feet of Gas annually. He must be thoroughly qualified to make Gas, lay Services, repair Lamps, and take records of Meters.

Full particulars of the duties required may be obtained on application by letter, addressed to the Surveyor of the Board, Dalton-in-Furness.

Applications, in own handwriting (with not more than three recent testimonials), stating experience, age, and wages required, to be delivered at my Office on or before Saturday, the 17th of June, 1893.

J. Tyson, Solicitor,
Clerk to the Board.

Dalton-in-Furness,
May 29, 1893.

TO INVENTORS AND OTHERS.

PATENTS for Inventions Secured and TRADE MARKS REGISTERED throughout the World. Advice on all matters connected with the above. Handbook gratis on application.

J. C. Chapman, C.E., Chartered Patent Agent, 70, Chancery Lane, London.

JOHN RILEY & SONS, Chemical Manu-facturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

GOLD MEDAL, 1892.

TUBES and Fittings for Gas, Steam, and Water, in stock to 8 inches diameter; Iron and Steel Ascension-Pipes.

John Spencer, Globe Tube Works, Wednesbury; and 14, Great St. Thomas Apostle, London.

CHARTERING, FORWARDING, AND INSURANCE.

ROBERT BRUCE FITZMAURICE, 29, Great St. Helens, London, Shipping Agent to several Gas Companies and Plant Manufacturers, would be glad to UNDERTAKE LARGE or SMALL SHIPMENTS to any Port.

WANTED, immediately, a good Main and SERVICE LAYER.

Forward testimonials to No. 2233, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, Gas Liquor.

Address George Dobson, Limited, Cardiff.

WANTED, to Rent, Lease, or Purchase, a SMALL GAS-WORKS.

Particulars to No. 2244, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

GASHOLDER (self-contained) wanted about 200 cubic feet of Gas.

Address O. M., care of J. W. Vickers, 5, Nicholas Lane, E.C.

EXHAUSTER (Rotary), perfectly New (Makers, Dempster and Sons), 20,000 cubic feet per hour, ON SALE, cheap.

Apply to T. G. Marsh, 41, Corporation Street, Manchester.

RAILWAY TANK-WAGGONS.

THE Advertiser is prepared to Sell or LET ON HIRE two RAILWAY TANK-WAGGONS, nearly new. Suitable for Tar or Gas Water, &c.

Address No. 2237, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

ALDERSHOT GAS AND WATER COMPANY.

KIRKHAM'S Scrubber, with 8-inch Connections, and four 12 feet square PURIFIERS to be Sold.

Offers to be addressed to the Honorary Secretary, at the Offices of the Company, 103, Victoria Road, Aldershot.

FOR SALE, the following second-hand GAS PLANT:—

GASHOLDER, 35 ft. by 14 ft.
GASHOLDER and Cast-Iron TANK, 30 ft. by 17 ft.
Four PURIFIERS, 12 ft. square by 4 ft. 6 in. deep.
Cast-Iron SCRUBBER, 36 ft. high by 10 ft. diameter.
CONDENSERS to pass 500,000 cubic feet per diem.
EXHAUSTER to pass 20,000 cubic feet per hour.

Also various other sizes of above or any Gas Plant. Inquiries invited.

Apply to Saml. While, 60, Queen Victoria St., E.C.

SPECIAL BARGAIN.

FOR SALE—Two perfectly new Cast-Iron SCRUBBERS, 10 feet diameter by 50 feet high, with Wrought-Iron Domes, Cast-Iron Spiral Staircase, &c., complete. All plates machine planed. One or both Scrubbers will be sold to suit purchasers.

A perfectly new 30,000 per hour HORIZONTAL DOUBLE PUMP RECIPROCATING EXHAUSTER, with Steam-Engine, with Connections and Valves.

One Second-hand (thoroughly overhauled) VERTICAL PUMP EXHAUSTER, with Steam-Engine (with clean Water and Liquor Pumps attached), to pass 7000 cubic feet of Gas per hour.

One Second-hand (thoroughly overhauled) ROTARY EXHAUSTER, to pass 7000 cubic feet per hour (without Engine), fitted with Pulleys.

The whole of the above Plant can be inspected, and full particulars with prices will be sent, on application to No. 2241, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

GREAT WIGSTON GAS COMPANY.

TO CONTRACTORS, IRONFOUNDERS, ETC.

THE Directors of the above Company are prepared to receive TENDERS for the delivery and laying complete of about 1620 yards of 15-inch CAST-IRON SOCKET AND SPIGOT PIPES.

For Specification Forms of same, apply at once to the undersigned.

John A. Harris,
Engineer and Manager.

SADLER AND CO., LIMITED, Middlesbrough; Ulverston (Barrow); Portsmouth; Carlton; Stockton; 315, St. Vincent Street, Glasgow; 10, Marsden Street, Manchester; and 85, Water Street, New York. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.

Head Office: Middlesbrough. Correspondence invited.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

BOROUGH OF OLDHAM.

THE Gas-Works Committee invite TENDERS for the TAR and AMMONIACAL LIQUOR to be produced at their different Gas Stations for a period of One Year, commencing the 1st of July next.

The yearly make of Tar is about 6400 tons; and of Ammoniacal Liquor, about 2,400,000 gallons.

Particulars and Forms of Tender can be obtained on application to Mr. Herbert Andrew, Gas and Water Offices, Oldham, to whom tenders are to be sent on or before Tuesday, the 13th of June, 1893.

A. Nicholson,
Town Clerk.

Oldham, May 24, 1893.

GAS COAL.

THE Directors of the Leyland and Farington Gas Company are prepared to receive TENDERS for the supply of COAL and CANNEL from the 30th of June, 1893, for Twelve Months.

Quantity used: About 2000 tons of Coal, and 300 tons of Cannel.

To be delivered free at Leyland Station in such quantities as required.

Sealed tenders, endorsed "Gas Coal," and addressed to the Directors, to be in by Monday, the 19th of June, 1893.

No special Form of Tender supplied.

Charles Elliott,
Secretary and Manager.

Leyland, Lancs.,
June 1, 1893.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the Leyland and Farington Gas Company are prepared to receive TENDERS for the surplus TAR and LIQUOR produced at their Works for Twelve Months from the 30th of June, 1893.

Quantity made: About 150 tons of Tar, and 400 tons of Liquor.

Delivered free on Rails in Contractor's Tanks.

Sealed tenders, endorsed "Tar and Liquor," and addressed to the Directors, to be in by Monday, the 19th of June, 1893.

Charles Elliott,
Secretary and Manager.

Leyland, Lancs.,
June 1, 1893.

HORSHAM GAS COMPANY, LIMITED.

TENDERS FOR COAL AND CANNEL.

THE Directors of the Horsham Gas Company, Limited, invite TENDERS for the supply of about 2700 tons of South Yorkshire well-screened SILKSTONE GAS COAL, and about 150 tons of CANNEL, for Twelve Months, from the 1st of July, 1893, to the 30th of June, 1894.

The Cannel to produce 11,000 cubic feet of 30-candle Gas per ton, and a good saleable Coke.

Both Coals must be free from Bats and Sulphurous Pyrites, or other objectionable matter.

The deliveries are to be made in such quantities and at such times as may be directed by the Manager.

Tenders, stating the price per ton of 20 cwt., delivered free in the Goods Yard, Horsham Station, to be sent to the undersigned not later than Friday, the 9th of June, 1893, and endorsed "Tender for Coal and Cannel."

The Directors do not bind themselves to accept the lowest or any tender.

Any further information may be obtained from

E. D. Sapey,
Manager.

Gas Offices, Horsham,
May 26, 1893.

HORSHAM GAS COMPANY, LIMITED.

TENDERS FOR TAR AND LIQUOR.

THE Directors of the Horsham Gas Company, Limited, invite TENDERS for the purchase of the surplus TAR and LIQUOR produced at their Works during the Twelve Months from the 1st of July, 1893, to June 30, 1894; the quantity being about 30,000 gallons of Tar and 64,000 gallons of Liquor.

Tenders to state the price per cask of 40 gallons on Rail at Horsham Station, and in such quantities as may be directed by the Company's Manager.

The Liquor to be of 5° Twaddel.

The Contractors will supply all casks.

Tenders to be sent to the undersigned not later than Friday, the 9th of June, 1893, and endorsed "Tender for Tar and Liquor."

The Directors do not bind themselves to accept the highest or any tender.

Any further information may be obtained from

E. D. Sapey,
Manager.

Gas Offices, Horsham,
May 26, 1893.

LONGWOOD GAS COMPANY.

TAR AND LIQUOR.

THE Directors of the above Company are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR made at their Works during the Year commencing July 1, 1893.

The Liquor to be 5° Twaddel.

The estimated quantity for disposal is about 950 tons.

Sealed tenders, endorsed "Tar and Liquor," addressed to the Chairman, Gas Offices, Longwood, Huddersfield, to be sent in not later than Tuesday, June 20, 1893.

By order,
JOHN LOWE MITTON,
Manager and Secretary.

TENDERS FOR COAL.

THE Directors of the Longwood Gas Company invite TENDERS for the supply of from 1000 to 5000 tons of the best screened and also unscreened GAS COAL, to be delivered during the year ending June 30, 1894, in the Station Siding, Longwood, in such quantities as may be required by their Gas Engineer.

Tenders, sealed and endorsed "Gas Coal," addressed to the Chairman, Gas Offices, Longwood, Huddersfield, may be sent in not later than June 20, 1893.

By order,
JOHN LOWE MITTON,
Manager and Secretary.

TIPTON GAS-WORKS.

COAL CONTRACTS.

THE Gas Committee of the Tipton Local Board invite TENDERS for the supply of GAS COAL for a period of One, Two, or Three Years, from the 1st of July next, in annual quantities of about 10,000 tons, to be delivered, carriage free, to the Gas-Works Siding (L. & N. W. Railway).

Specification and Form of Tender may be obtained at the Gas-Works, on application to Mr. Vincent Hughes, the Engineer and Manager.

Sealed and endorsed tenders to be sent to me, the undersigned, not later than Ten a.m., on Friday, the 23rd inst.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
GEO. M. WARING,
Clerk to the Board.

Public Offices, Tipton,
June 1, 1893.

TIPTON GAS-WORKS.

TAR CONTRACTS.

THE Gas Committee of the Tipton Local Board invite TENDERS for the purchase of the surplus TAR produced at the above Works during a period of One, Two, or Three Years from the 1st of July next.

Particulars may be had at the Gas-Works on application to Mr. Vincent Hughes, the Engineer and Manager.

The Tar may be delivered either into Boats or on Rail (L. & N. W. Railway) as may be required.

Sealed and endorsed tenders to be sent to me, the undersigned, not later than Ten a.m., on Friday, the 23rd inst.

The Committee do not bind themselves to accept the highest or any tender.

By order,
GEO. M. WARING,
Clerk to the Board.

Public Offices, Tipton,
June 1, 1893.

BOROUGH OF DEWSBURY.

THE Lighting Committee are prepared to receive TENDERS for the supply and delivery at their Gas-Works, Savile Town, near Dewsbury, of the following quantities of best screened GAS COAL during a period of One, Two, or Three Years, commencing on the 1st day of July next:—

First Year . . .	17,000 tons.
Second Year . .	17,500 tons.
Third Year . . .	18,000 tons.

Tenders must specify prices for delivery by Road, or by Water, or by Rail, and be made on Forms to be had on application to Chas. A. Craven, Engineer and Manager, Savile Town Gas-Works, Dewsbury, from whom any further information can be obtained.

Sealed tenders, endorsed "Tender for Gas Coal," to be sent to me not later than Saturday, the 10th day of June next.

The Corporation do not bind themselves to accept the lowest or any tender.

E. MAWDESLEY,
Town Clerk.

Town Clerk's Office,
Town Hall, Dewsbury.

COUNTY BOROUGH OF HALIFAX.

TO MANUFACTURING CHEMISTS AND TAR DISTILLERS.

THE Gas-Works Committee of the Hali- fax Corporation are prepared to receive TENDERS for the purchase of the surplus TAR (about 4000 tons) produced at their Gas-Works during the Year ending the 30th of June, 1894.

Delivery must take place from the Railway Siding of the Corporation Gas-Works, or from the Canal Wharf of the Calder and Hebble Navigation Company, with which a Pipe communicates.

Full Particulars may be obtained on application to the Engineer, Mr. Thomas Holgate, F.C.S., Gas-Works, Halifax.

Sealed tenders, endorsed "Tar," stating the price offered per ton, and the mode of removal, to be sent to the undersigned not later than Ten a.m., on Friday, the 9th of June, 1893.

The highest or any tender will not necessarily be accepted.

By order,
KEIGHLEY WALTON,
Town Clerk.

Town Hall, Halifax,
June 2, 1893.

TO CONTRACTORS.

THE Market Harborough Gas Company invite TENDERS for

2000 tons of screened GAS COAL.
100 tons of LIME.

The Coal must be sent in monthly and as directed by the Manager, Mr. F. Armitage, of whom any further information may be obtained.

Tenders, giving price per ton at Market Harborough Station, to be sent to Wm. Gilbert, Esq., Northampton Road, Market Harborough, by the 15th inst.

The lowest or any tender not necessarily accepted.

CHAS. BURGOINE,
Clerk.

June 3, 1893.

BOROUGH OF BATLEY.

TENDERS FOR GAS COAL.

THE Corporation of Batley are prepared to receive TENDERS for the supply and delivery at their Gas-Works of 13,000 tons of GAS COAL.

Conditions and Forms of Tender may be obtained on application to the Manager at the Gas-Works.

Sealed tenders, addressed to me, and endorsed "Gas Coal," to be delivered at my Office on or before Saturday, the 24th day of June inst.

The Corporation do not bind themselves to accept the lowest or any tender, and may accept any tender for a part only of the specified quantity.

JOS. HANSON CRAIK,
Town Clerk.

Town Clerk's Office, Batley,
June 3, 1893.

LINCOLN CORPORATION.
(GAS DEPARTMENT.)

TENDERS FOR TAR AND AMMONIACAL LIQUOR.

THE Gas Committee of the Corporation of Lincoln are prepared to receive TENDERS for the purchase of the Surplus TAR, and of the whole of the AMMONIACAL LIQUOR produced at their Works during the period of One Year, commencing on the 1st of July, 1893.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Residuals," must be delivered at the Gas Offices, Newland, on or before the 26th inst.

The Committee do not bind themselves to accept the highest or any tender.

Information as to quantities and other particulars may be obtained of the undersigned.

JNO. CARTER, Manager.

Gas-Works, Lincoln,
June 5, 1893.

CORPORATION OF LANCASTER.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL.

THE Gas Committee are prepared to receive TENDERS for the supply of GAS COAL, delivered, on the Gas-Works Siding, Lancaster, in such quantities and at such times as may be required during a period of One, Two, or Three Years, commencing delivery Aug. 1 next.

Sealed tenders, endorsed "Gas Coal," giving full particulars of the Coal offered, must be delivered to W. O. Roper, Esq., Town Clerk, Lancaster, on or before the 19th day of June next.

Forms of Tender may be obtained on application to the undersigned.

The lowest or any tender not necessarily accepted.

CHAS. ARMITAGE,
Manager.

Gas-Works, Lancaster,
May 25, 1893.

MANCHESTER CORPORATION GAS-WORKS.

TO GASHOLDER MAKERS.

THE Gas Committee of the Manchester Corporation are prepared to receive TENDERS for the construction of a THREE-LIFT TELESCOPIC GASHOLDER, having a total capacity of 7,000,000 cubic feet, at their Bradford Road Gas-Works.

General Conditions and Specification and Quantities can be obtained on application (in writing only) to Mr. C. Nickson, Superintendent of the Gas Department, Town Hall. A deposit of Three Guineas, which will be returned on receipt of a *bond fide* tender, must accompany each application for Particulars and Tender Form.

The Committee do not bind themselves to accept the lowest or any tender.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Gasholder," must be delivered at the Gas Offices, Town Hall, not later than Ten o'clock a.m. on the 1st of July, 1893.

By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.

Town Hall, Manchester,
June 2, 1893.

TENDERS FOR GAS COAL.

THE Directors of the Sunderland Gas Company are prepared to receive TENDERS for 60,000 tons of GAS COALS (in lots of 5000 tons and upwards), to be delivered, by Rail, on the Company's Sidings at Hendon or Ayre's Quay Gas-Works, in such monthly proportions, from July 1, 1893, to June 30, 1894, as the make of Gas may render necessary.

The Coals to be clean, dry, and fresh worked.

Tenders, endorsed "Tender for Gas Coals," specifying the description of Coals, the name of the Pit and the particular Seam from which the Coal is to be supplied, to be left at the Offices of the Company, Borough Road, Sunderland, on or before Ten a.m. on Tuesday, June 13.

Short weight or inferior quality to be allowed for.

The Company do not bind themselves to accept the lowest or other tender until after a satisfactory trial of the Coals to which such tender may relate shall have been made.

J. H. COX,
Secretary and Manager.

Sunderland,
June 1, 1893.

BRICK TANK.

TENDERS required for the excavation and construction of a BRICK TANK, 41 ft. 6 in. diameter by 16 ft. deep. The work to be done at the Staveley Gas-Works, Staveley, near Chesterfield.

Plans and Particulars may be had on application to Messrs. WESTWOOD AND WRIGHTS, BRIERLEY HILL.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply and erection of a CONDENSER at their Liverpool Street Works.

Full Particulars may be obtained of the Gas Engineer, Gas Offices, Salford.

Sealed tenders, endorsed "Tender for Condenser," addressed to the Chairman of the Gas Committee, to be delivered to me before Five p.m., on Thursday, the 15th inst.

By order,
SAML. BROWN,
Town Clerk.

Town Hall, Salford,
June 2, 1893.

YSTRAD GAS AND WATER COMPANY.

THE above Company invite Tenders for the purchase of COAL TAR for the Twelve Months ending the 30th of June, 1894, made at their Gas-Works, at Ystrad and Porth.

Tenders to be sent to the Secretary's Office not later than Monday, the 12th of June, 1893.

For further Particulars, apply to the Manager, Mr. F. J. Baynes, Pentre, near Pontypridd, Glamorganshire.

ARTHUR P. JAMES,
Secretary.

123, Queen Street, Cardiff,
June 1, 1893.

COUNTY BOROUGH OF BURY.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Gas Committee of the Corporation of Bury are prepared to receive TENDERS for the supply of GAS COAL and CANNEL for One, Two, or Three Years, commencing on the 1st day of July next, to be delivered free at the Corporation Siding, Bury, in such quantities as may be required from time to time.

Estimated quantity, about 27,000 tons of Coal, and 3000 tons of Cannel per annum.

Full Particulars and Form of Tender may be obtained on application to Mr. Gendall, Manager at the Gas-Works, Elton, Bury.

Sealed tenders, endorsed "Tender for Coal and Cannel," to be sent to me, the undersigned, on or before Saturday, June 24, 1893.

The Corporation do not bind themselves to accept the lowest or any tender.

JOHN HASLAM,
Town Clerk.

Corporation Offices, Bury,
May 28, 1893.

CARDIFF GASLIGHT AND COKE COMPANY.

TENDERS FOR COALS.

THE Directors of the above Company are prepared to receive TENDERS for a supply of 50,000 tons of best, well-screened, large GAS COALS, to be delivered between July, 1893, and June 30, 1894, in monthly quantities, in accordance with the Specification.

Parties tendering may do so for the whole quantity or for quantities from 5000 tons upwards.

Forms of Tender and Specification of monthly deliveries may be obtained on application to Mr. H. Morley, the Company's Engineer.

Sealed tenders to be sent to the undersigned not later than Thursday, the 8th day of June next, addressed to the Chairman of the Company, and endorsed "Tender for Coal."

The Directors do not bind themselves to accept the lowest or any tender, and reserve to themselves the right to apportion the whole quantity as they may think fit.

By order,
GEORGE CLARRY,
Secretary.

Gas Offices, Cardiff,
May 10, 1893.

BOROUGH OF MACCLESFIELD.

THE Gas Committee are prepared to receive TENDERS for the supply of the undermentioned Materials and Carting required during a period of Twelve Months, commencing the 1st of July, 1893:—

(1) The best hand-picked BUXTON LIME, delivered fresh at Macclesfield, free from Dirt and Ashes, in such quantities as may be ordered.
(2) Wrought-Iron Lap-welded STEAM TUBES and FITTINGS.
(3) Cast-Iron MAINS and IRREGULARS.
(4) OILS, PAINT, and DRUGGISTS' SUNDRIES.
(5) CARTING.
(*a.*) Contractors to state price per ton over the Gas Committee's Weighing-Machine from the Railway Companies' Yards and Canal Wharf, Buxton Road.
(*b.*) Contractors to provide own Fillers, Horses, Carts, Shovels, Props, and all Implements; also to arrange with the Railway Companies as to Waggons being placed in position and standing under load, and be answerable for all demurrage.
(*c.*) The particulars of the Waggons containing the materials to be emptied, and any other materials that require to be carted, will be furnished to the Contractor at the Gas Office each Morning at Eight o'clock.

Any further Information required can be obtained on application to Mr. Newbigging, Engineer, Gas-Works.

Sealed tenders, properly endorsed, to be addressed to the Chairman, Gas Committee, Town Hall, Macclesfield, and to be sent in not later than Saturday, the 24th of June, 1893.

The Committee do not bind themselves to accept the lowest or any tender.

W. FREDK. TAYLOR,
Town Clerk.

May 29, 1893.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the Ashbourne (Derbyshire) Gas Company invite TENDERS for the purchase of the surplus TAR and LIQUOR produced at their Works, for One, Two, or Three Years from July 1, 1893.

Particulars from

E. S. BRADLEY,
Managing Director.

Ashbourne.

BOROUGH OF NELSON.

TO COLLIERY OWNERS.

THE Gas Committee of the Corporation of Nelson are prepared to receive TENDERS for the supply of GAS COALS for the next Twelve Months.

Forms of Tender may be had from the Manager, Mr. W. Foster.

Sealed tenders, endorsed "Tender for Coal," and addressed to the undersigned, to be sent in by the 14th day of June.

By order,
R. M. PRESCOTT,
Town Clerk.

Town Hall, Nelson,
May 31, 1893.

COUNTY BOROUGH OF STOCKPORT.
(GAS DEPARTMENT.)

TO ENGINEERS, ETC.

THE Gas Committee are prepared to receive TENDERS for the supply and erection of an EXHAUSTER (70,000 cubic feet per hour capacity) for their Portwood Works.

Full Details and all Information can be obtained on application to the Engineer, Mr. S. Meunier, Stockport.

Tenders, endorsed "Exhauster," and addressed to the Chairman of the Gas Committee, to be sent in on or before the 8th of June, 1893.

No tender will be accepted without satisfactory proof that the firm tendering pays the standard rate of wages, and observes the standard number of hours.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
WALTER HYDE,
Town Clerk.

Stockport, May 24, 1893.

COUNTY BOROUGH OF STOCKPORT.
(GAS DEPARTMENT.)

TENDERS FOR TAR AND AMMONIACAL LIQUOR.

THE Gas Committee invite Tenders for the purchase of the surplus TAR, and the whole of the AMMONIACAL LIQUOR produced at their Works, for a period of One, Two, or Three Years, commencing on the 1st of July, 1893.

Particulars as to quantity and Conditions of Contract may be obtained on application to the Engineer, Mr. S. Meunier, Stockport.

Tenders, endorsed with the subject of tender, and addressed to the Chairman of the Gas Committee, must be sent in on or before the 8th of June, 1893.

The Committee do not bind themselves to accept the highest or any tender.

By order,
WALTER HYDE,
Town Clerk.

May 23, 1893.

COUNTY BOROUGH OF STOCKPORT.
(GAS DEPARTMENT.)

CONTRACT FOR LIME.

THE Gas Committee are prepared to receive TENDERS for the supply of about 2500 tons of LIME during the Year ending June 30, 1894.

Forms of Tender and Specification, together with any further Information, may be obtained from the Engineer, Mr. S. Meunier, Stockport.

No Form of Tender other than that supplied by the Committee will be entertained.

Tenders, stating price per ton delivered on Rails, Stockport, endorsed "Tender for Lime," and addressed to the Chairman of the Gas Committee, must be sent in on or before the 8th of June, 1893.

No tender will be accepted without satisfactory proof that the firm tendering pays the standard rate of wages, and observes the standard number of hours.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
WALTER HYDE,
Town Clerk.

May 23, 1893.

COUNTY BOROUGH OF STOCKPORT.
(GAS DEPARTMENT.)

TO COLLIERY OWNERS AND OTHERS.

THE Gas Committee are prepared to receive TENDERS for the supply of CANNEL and COAL for a period of One, Two, or Three Years commencing upon the 1st of July next.

Forms of Tender and Specification, together with any further information, may be obtained from the Engineer, Mr. S. Meunier, Stockport.

No Form of Tender other than that issued by the Committee will be entertained.

Tenders, stating price per ton delivered at the Railway Stations, Stockport, endorsed "Tender for Cannel" or "Coal," and addressed to the Chairman of the Gas Committee, must be sent in on or before the 10th of June, 1893.

No tender will be accepted without satisfactory proof that the firm tendering pays the standard rate of wages, and observes the standard number of hours.

The Committee reserve the right to accept tenders for the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any tender.

By order,
WALTER HYDE,
Town Clerk.

May 23, 1893.

BOROUGH OF EVESHAM.
(GAS DEPARTMENT.)

THE Corporation invite Tenders for the supply of from 500 to 2000 tons of best screened GAS COAL during the Year ending the 30th of June, 1894, to be delivered on Rail at Evesham.

Tenders to be sent in to me not later than the 22nd of June inst.

The Corporation do not bind themselves to accept the lowest or any tender.

THOS. COX,
Town Clerk.

Town Clerk's Office, Evesham,
June 1, 1893.

TO OXIDE OF IRON MERCHANTS.

THE Corporation of Birkenhead are prepared to receive TENDERS for the supply of 250 tons of OXIDE OF IRON.

Forms of Tender and any other Information may be obtained from Mr. T. O. Paterson, C.E., Gas Engineer, Gas-Works, Thomas Street.

Tenders, sealed and endorsed "Tender for Oxide of Iron," to be sent in to me not later than FIVE p.m., on Friday, the 9th of June, 1893.

Deliveries to be made within one month of written instructions from the Gas Engineer.

The Corporation do not bind themselves to accept the lowest or any tender.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
May 29, 1893.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Corporation of Birkenhead are prepared to receive TENDERS for the supply of COAL, COAL NUTS, CANNEL, and CANNEL NUTS, for Gas-making purposes, for a period of One, Two, or Three Years, commencing from the 26th of June, 1893.

Forms of Tender, together with any further Information, may be obtained from Mr. T. O. Paterson, C.E., Gas Engineer, Gas-Works, Birkenhead.

Tenders (accompanied by copy of analysis), stating the price per ton, delivered on to the Gas-Works Railway Siding, must be sent in to me, sealed and endorsed "Tender for Gas-Works Coal," not later than Five o'clock in the Afternoon of Friday, the 9th of June, 1893.

Also for a supply of STEAM COAL and SLACK, to be delivered at the Pumping-Stations of the Spring Hill, Flaybrick Hill, and Borough Road Water-Works, for a period of One, Two, or Three Years, commencing from the 26th of June, 1893.

Deliveries to be made from time to time according to the requirements of the respective Engineers.

Forms of Tender, together with any further Information, may be obtained from Mr. W. A. Richardson, C.E., Water Engineer, Town Hall, Birkenhead.

Tenders, stating the price per ton delivered at the various Pumping-Stations, must be sent in to me, sealed and endorsed "Tender for Water-Works Coal," not later than Five o'clock in the Afternoon of Friday, the 9th of June, 1893.

The Corporation do not bind themselves to accept the lowest or any tender.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
May 29, 1893.

TO TAR DISTILLERS AND OTHERS.

THE Corporation of Birkenhead invite OFFERS for the purchase and removal of the surplus TAR produced at their Gas-Works during a period of One Year commencing on the 1st of July, 1893.

Deliveries will be made at the Gas-Works, either into Contractor's Tanks on the Gas-Works Railway Siding, or into Tanks for conveyance by road to Boats.

The Contractor whose Tender is accepted will be required to enter into a formal contract or agreement with the Corporation upon the specific terms and conditions contained in the draft contract which has been prepared by the Town Clerk, and deposited in his Office for inspection.

Forms of Tender and further Particulars may be obtained from the Gas Engineer, Mr. T. O. Paterson, C.E., Gas-Works, Thomas Street.

Tenders, sealed and endorsed "Tender for Tar," to be sent in to me not later than Five p.m., on Friday, the 9th of June, 1893.

The Corporation do not bind themselves to accept the highest or any tender.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
May 29, 1893.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Corporation of Birkenhead invite OFFERS for the purchase and removal of the AMMONIACAL LIQUOR, produced at the Gas-Works, for a period of One, Three, or Five Years, commencing on the 1st of July, 1893.

A pipe is laid between the Gas-Works and the River Mersey for the conveyance of Liquor into the Contractor's Boats; or, if desired, the Corporation will provide appliances on their own Railway Siding to pump the Liquor direct into the Contractor's Tank-Waggons.

The Contractor whose tender is accepted will be required to enter into a formal contract or agreement with the Corporation upon the specific terms and conditions contained in the draft contract which has been prepared by the Town Clerk, and deposited in his Office for inspection.

Forms of Tender and further Particulars may be obtained from Mr. T. O. Paterson, C.E., Gas Engineer, at the Gas-Works, Thomas Street.

Tenders, sealed and endorsed "Tender for Ammoniacal Liquor," to be sent in to me not later than Five p.m., on Friday, the 9th of June, 1893.

The Corporation do not bind themselves to accept the highest or any tender.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
May 29, 1893.

THE Gas Committee of the Keighley Corporation are prepared to receive TENDERS for the supply of the following MATERIALS, during the next Twelve Months; viz:—

23,000 tons of GAS COAL.
200 tons of SULPHURIC ACID.

Particulars and Form of Tender may be obtained on application to the undersigned, to whom tenders must be sent not later than Monday, the 19th of June.

By order,
JOHN LAYCOCK.

Gas Office, Keighley.

NEW MILLS LOCAL BOARD.

THE Gas Committee of the New Mills Local Board are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR produced at their Works from July 1, 1893, to June 30, 1894.

Particulars may be obtained on application to the Manager, Mr. E. Jones, Gas Office, New Mills.

Tenders, to state price per ton of 20 cwt. at the Works or at Midland Goods Station. The tender for Liquor to state price per ton of 5° and upwards.

Tenders, endorsed "Tar and Liquor," to be addressed to the Chairman, Local Board, and to be sent in not later than Twelve o'clock Noon, on the 20th of June next.

The Committee do not bind themselves to accept the highest or any tender.

JOHN POLLITT,
Clerk.

Town Hall, New Mills,
May 29, 1893.

COUNTY BOROUGH OF WEST BROMWICH.
(GAS DEPARTMENT.)

TO COLLIERY PROPRIETORS.

THE Gas Committee are prepared to receive TENDERS for the supply of 22,000 tons of best screened GAS COAL, for use at their Works, Albion, West Bromwich; also from 200 to 300 tons of SCOTCH or other high-class CANNEL COAL.

The Committee do not bind themselves to accept the lowest or any tender; and they reserve to themselves the right to divide the contract between several Firms.

Form of Tender may be obtained upon application to Mr. W. Littlewood, Manager of the Works.

Sealed tenders, properly endorsed, to be addressed to me not later than Thursday, June 15.

By order,
THOS. HUDSON,
Secretary.

Town Hall, West Bromwich,
May 25, 1893.

BRIDGNORTH CORPORATION GAS-WORKS.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Gas Committee are prepared to receive sealed TENDERS for the supply of GAS COAL, including carriage to the Bridgnorth Railway Station, as follows:—

(1) For One or Two Years, determinable at the option of the Gas Committee at the end of the first or second year.
(2) For One Year only.

Evidence as to quality of Coal must accompany each tender.

Quantity required: About 2000 tons per annum, in proportionate deliveries as directed.

The contract to commence at the end of July.

Sealed and marked tenders must be sent to the undersigned not later than Saturday, the 10th of June.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
J. H. COOKSEY, Town Clerk,
Secretary.

Bridgnorth, May 27, 1893.

HAYWARDS HEATH GAS COMPANY, LIMITED.

GAS COAL.

THE Directors of the above Company invite TENDERS for the supply of about 1500 tons of GAS COAL, deliveries of which are to commence the first week in July, 1893, and to be continued in such quantities as they shall from time to time require until the 30th of June, 1894.

The Coal required is to be unscreened, and be delivered in Trucks (free) at the Haywards Heath Railway Station, L. B. & S. C. Railway, either from the South Yorkshire or Durham Coal-Fields.

Payments, net cash monthly.

Tenders are to state the names of the Pits from which the above description of Coal will be supplied, the same to be fresh wrought and free from Slate, and to the entire satisfaction of the Company's Manager.

The Board have no special Form of Tender, and do not bind themselves to accept the lowest or any tender.

Tenders are to be received by me on or before the 15th day of June next, and endorsed "Tender for Gas Coal."

ARTHUR H. CÆSAR,
Secretary.

85, Gresham Street, London, E.C.

BROMLEY GAS CONSUMERS' COMPANY.

SALE BY AUCTION OF 200 ORDINARY SHARES OF £10 EACH.

THE Directors give notice that they have instructed Messrs. Baxter, Payne, and Lepper, to SELL by AUCTION, at the Bell Hotel, Bromley, Kent, on Wednesday, the 21st of June, 1893, at Eight o'clock p.m. precisely, in lots of Five and Ten Shares each, 200 ORDINARY SHARES of £10 each in the Bromley Gas Consumers' Company.

The Dividend paid upon this class of Shares for the past Two Years has been at the rate of 8½ per cent. per annum.

Particulars and Conditions of Sale may be obtained of the SECRETARY of the Company; Messrs. WILLETT AND LATTER, Solicitors, Market Square, Bromley, KENT; and of the AUCTIONEERS, Market Square, Bromley, KENT.

By order,
H. W. AMOS,
Secretary.

WOODBRIDGE GASLIGHT AND COKE COMPANY, LIMITED.

THE Directors of the above Company invite TENDERS for the supply of 1000 tons of screened or unscreened, fresh wrought GAS COALS, to be delivered during a period of Twelve Months.

Tenders to be for price f.o.b. in Tyne or Humber, and sent to the Secretary not later than the 13th of June, 1893.

The Directors do not pledge themselves to accept the lowest or any tender.

ALFRED GALL,
Secretary.

June 3, 1893.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Ossett Gas Company are prepared to receive TENDERS for the purchase of the AMMONIACAL LIQUOR and surplus TAR produced at their Works during the Twelve Months ending the 30th of June, 1894.

The Liquor to be quoted for both by Twaddell's and Wills's tests.

Tenders to be sent in not later than Wednesday, the 14th inst.

By order,
JAS. CASTLE,
Secretary.

Ossett, June 2, 1893.

FENTON URBAN SANITARY DISTRICT.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply and delivery of 3000 tons of good GAS COAL or BURGY.

Form of Tender and Particulars may be obtained from the Manager.

Tenders to be sent in on or before Tuesday, the 20th inst., marked "Tender for Coal," and addressed to the Chairman, Gas-Works, Fenton.

F. H. DARWIN,
Manager.

Gas Offices, Fenton,
June 1, 1893.

KINETON GASLIGHT, COAL, AND COKE COMPANY, LIMITED.

THE Directors are prepared to receive TENDERS for the supply of 250 tons of best screened SILKSTONE GAS COAL, to be delivered, into their Works at Kineton, between July 1, 1893, and June 30, 1894.

The Directors do not bind themselves to accept the lowest or any tender.

Tenders to be sent to the Secretary not later than the 15th of June next.

GEO. LINES,
Secretary.

Kineton, June 6, 1893.

BRIERLEY HILL DISTRICT GASLIGHT COMPANY.

THE Directors of the above Company invite TENDERS for the supply of 5000 to 6000 tons (20 cwt. to the ton) of GAS COAL, to be delivered in quantities as required to Brettell Lane Station or Round Oak Siding, G.W.R., by the 30th of June, 1894.

The Board do not bind themselves to accept the lowest or any tender.

Tenders to be addressed to the Chairman not later than the 23rd of June next, and endorsed "Tender for Gas Coal."

No Tender Forms are issued.

HENRY M. JACKSON,
Secretary.

Board-Room, Gas-Works,
Brierley Hill, May 29, 1893.

FROME GAS COMPANY.

THE Directors of the above Company are prepared to receive TENDERS for the supply of from 500 to 4200 tons of best screened GAS COAL, to be delivered at the Gas-Works Siding between July 1, 1893, and June 30, 1894.

Tenders to be sent to me not later than June 24, 1893, endorsed "Tender for Coal."

The Directors do not bind themselves to accept the lowest or any tender.

H. F. VINCENT,
Manager.

Gas-Works, Frome,
May 27, 1893.

PADIHAM AND HAPTON LOCAL BOARD.

THE Gas Committee of the above Board invite TENDERS for the supply of GAS COAL for One, Two, or Three Years. The Coal to be delivered, as required, at the Padiham Railway Station.

For particulars, apply to the undersigned.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Gas Coal," must be sent to me not later than Saturday, June 17, 1893.

By order,
J. R. SMITH,
Clerk to the Board.

Local Board Offices, Padiham,
May 27, 1893.

LONDON COUNTY ASYLUM, BANSTEAD, SUTTON, SURREY.

THE Sub-Committee for the control and management of the above-named Asylum are prepared to receive an OFFER for the purchase of TAR.

Terms: Cash on removal.

Forms of Tender, containing estimated quantity for Sale, may be obtained on application to the Steward, at the Asylum; and the tenders, duly filled up, must be sent in sealed covers, marked "Tender for Purchase of Gas Tar," to the undersigned, on or before June 22, 1893.

The person or firm whose tender is accepted will be communicated with on or before June 26 prox.

R. W. PARTRIDGE,
Clerk of the Asylums Committee.

London Asylums Committee Office,
21, Whitehall Place, S.W.,
May 31, 1893.

THE INCORPORATED

Gas Institute.

THE THIRTIETH

ANNUAL GENERAL MEETING

OF THE MEMBERS

WILL BE HELD ON

Tuesday, Wednesday, and Thursday,

the 13th, 14th, and 15th June, 1893,

AT THE

CITY HALL, VICTORIA STREET, BELFAST.

THE CHAIR WILL BE TAKEN BY THE PRESIDENT,

DENNY LANE, Esq., M.A., J.P.

THE BENEVOLENT FUND.

The Annual General Meeting of the Donors and Subscribers to the Benevolent Fund will be held on Tuesday, 13th June, at 5 o'clock p.m.

F. G. BURFIELD, Secretary.

3, *Victoria Street, Westminster, S.W.*

PETERBOROUGH GAS COMPANY.

TENDERS FOR COAL.

THE Directors of the above Company invite TENDERS for the supply of best screened GAS COAL and NUTS, for One or Two Years, commencing the 1st of July next.

Form of Tender and Conditions may be obtained on application to the undersigned.

Tenders to be sent in by the 12th of June, 1893, endorsed "Coal," and addressed to the Chairman of the Company.

The Directors do not bind themselves to accept the lowest or any tender.

JOHN BARTON,
Secretary and Manager.

Gas-Works, New Road,
Peterborough, May 24, 1893.

CORPORATION OF STALYBRIDGE.

TAR AND AMMONIACAL LIQUOR.

THE Gas Committee of the above Corporation invite TENDERS for the purchase of the AMMONIACAL LIQUOR and surplus TAR produced at their Works for a term of One Year from the 1st day of July, 1893.

Conditions of Tender and necessary Particulars will be supplied on application to the undersigned.

Tenders, endorsed outside, to be addressed to the Chairman of the Gas Committee by the 17th of June.

The Committee do not bind themselves to accept the highest or any tender.

By order,
ERNEST A. LOAM,
Engineer and Manager.

Gas Offices, Stalybridge,
May 31, 1893.

THE Hindley Local Board are prepared to receive TENDERS for the supply of GAS COAL, THROUGH AND THROUGH, COBBLES, NUTS, SLACK CANNEL, and LIME, required at their Gas-Works during the ensuing Twelve Months; and also for the purchase of the TAR and AMMONIACAL LIQUOR produced at their Gas-Works during the ensuing Twelve Months.

Full Particulars, with Forms of Tender, can be obtained on application to Mr. Wm. Dickinson, Gas and Water Manager.

Sealed tenders, endorsed "Tender for Gas Coal," &c., to be lodged with the undersigned not later than Monday, June 19, 1893.

By order,
STEPHEN HOLT,
Clerk to the Local Board.

Offices: Cross Street, Hindley,
June 1, 1893.

DARWEN CORPORATION GAS-WORKS.

COAL AND CANNEL.

THE Gas Committee of the above Corporation are prepared to receive TENDERS for the supply of COAL and CANNEL for One, Two, or Three Years, commencing the 1st of July 1893.

Quantities: 10,000 to 12,000 tons of Coal, and 4000 tons of Cannel per annum.

Particulars and Forms of Tender may be obtained from the Engineer, Mr. T. Duxbury, Gas-Works, Darwen.

Sealed tenders, endorsed "Coal" or "Cannel" respectively, to C. Costeker, Esq., Town Clerk, Darwen, not later than Saturday, the 24th of June inst.

By order,
C. COSTEKER,
Town Clerk.

June 1, 1893.

LEIGH LOCAL BOARD.

THE Gas Committee of the Leigh Local Board invite TENDERS for the supply of GAS COAL or NUTS, and ROUND CANNEL or CANNEL NUTS, for a period of One or Two Years, commencing on the 1st of July next.

The quantity required is 9000 tons of Coal, and 1000 tons of Cannel yearly.

Specifications, with Tender Forms and all Particulars, may be had from the undersigned.

Sealed tenders, endorsed "Coal" or "Cannel," and addressed to the Chairman of the Gas Committee, to be delivered at the Town Hall, Leigh, not later than Monday, the 19th inst.

The lowest or any tender not necessarily accepted.

ALFRED T. FLETCHER,
Engineer and Manager.

Gas-Works, Leigh, Lancs.,
June 3, 1893.

COUNTY BOROUGH OF HUDDERSFIELD.

GAS COAL.

THE Gas Committee are prepared to receive TENDERS from Colliery Proprietors for the supply and delivery of 50,000 tons of GAS COAL.

Form of Tender and full Particulars may be obtained on application to Mr. W. R. Herring, Engineer, Gas-Works, Huddersfield.

Sealed tenders, endorsed "Tender for Coal," to be addressed and sent to him not later than Friday, the 16th of June, 1893.

By order,
H. BARBER,
Town Clerk.

Huddersfield, June 2, 1893.

THE GASLIGHT AND COKE COMPANY.

NOTICE is hereby given, that the TRANSFER BOOKS of this Company, so far as they relate to DEBENTURE STOCKS and BONDS WILL BE CLOSED at One o'clock p.m. on Saturday, the 10th prox., for the Half Year ending on the 30th prox., and will be re-opened on the Morning of Monday, the 12th prox.

The Interest for the Half Year will be payable on the the 1st of July next to the Proprietors registered on the closing of the Books.

By order,
JOHN W. FIELD,
Secretary and General Manager.

Chief Office: Horseferry Road,
Westminster, S.W., May 30, 1893.

SOUTH METROPOLITAN GAS COMPANY.

NOTICE is hereby given, that an Ex-TRAORDINARY GENERAL MEETING of the Proprietors of this Company will be held at the Bridge House Hotel, London Bridge, in the Borough of Southwark, on Wednesday, the 28th day of June, at Two o'clock in the Afternoon precisely, to ELECT A DIRECTOR in the place of Mr. J. Mews (deceased).

Any Proprietor, duly qualified, intending to become a Candidate, must give notice in writing at the Office of the Company, at least 14 days previously to the day of election.

Proxies, to be available, must be transmitted to the undersigned not less than 48 hours before the time appointed for holding the Meeting.

By order,
FRANK BUSH,
Secretary.

709A, Old Kent Road, S.E.,
June 5, 1893.

Price 2s. per dozen, or 10s. 6d. per 100, post free.

CONSPIRACY and Protection of Property Act. It is required, under a Penalty of FIVE POUNDS, that a Printed Copy of the 4th Section of this Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat.

Printed copies of this Section, in large type, on broad sheets, may be obtained of WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

*** *The Act extends to Scotland and Ireland.*

NOTICE OF REMOVAL.

TO GAS ENGINEERS & MANAGERS

CROWTHER BROS.,

Contractors for Retort Setting, Erection of Gas Apparatus, and General Repairs, **have removed from 384, Mile End Road, to**

152, TEVIOT ST., ST. LEONARD'S ROAD, POPLAR, LONDON, E.

TAR AND LIQUOR PURCHASED.

JOHN CLARKSON MAJOR,

(Established 1851,)

Tar Distiller and Manufacturing Chemist,

WOLVERHAMPTON.

SCULCOATS, HULL.

AUG. KLÖNNE,

DORTMUND (GERMANY).

REGENERATIVE FURNACES.

Unsurpassed in Efficiency, Economy, Durability, and Easy Working.

FAMOUS LEESWOOD

"CURLEY CANNEL."

YIELD: 15,306 CUB. FT. PER TON OF 30·62-CANDLE POWER.

SMOOTH CANNEL.

YIELD: 12,321 CUB. FT. PER TON OF 21·321-CANDLE POWER.

PRICES AND PARTICULARS OF

MESSRS. S. CHANDLER & SONS,

LEESWOOD COAL AND CANNEL MINES,

PONTYBODKIN, nr. MOLD, NORTH WALES.

ARMSTRONG'S
PATENT
CANDLE SAFETY LAMPS

Are a great improvement on Oil, giving a good Light, requiring little or no Cleaning, and when once lighted no further attention is necessary. The Candles are made to burn 5, 7, or 9 hours.

43, MANCHESTER STREET, GRAY'S INN ROAD, W.C.

NIDDRIE CANNEL

A FIRST-CLASS CANNEL COAL,

Yielding a large volume of rich Gas, and fully 60 per cent. of first-class Coke.

FOR ANALYSIS, PRICE, AND ALL OTHER PARTICULARS, APPLY TO

The Niddrie & Benhar Coal Co., Ltd.,
4, York Buildings, Queen Street,
EDINBURGH.
Telegrams: "BENHAR, Edinburgh."

COKE BREAKERS,

PRICES REDUCED.
(THOMAS & SOMERVILLE'S PATENT.)
New Design, with two Cutting Rollers, making less Breeze than their old pattern.

For Exhauster Advertisement, see last week.

GEORGE WALLER & CO.,
PARK STREET, SOUTHWARK, E.C.,
And at STROUD, GLOUCESTERSHIRE.

HOLMSIDE GAS COALS.
(Wrought out of Holmside and South Moor Collieries.)

PRESENT production over 3200 tons per working day. Area of coal about 5000 acres, including the largest remaining workable proportion of pure HUTTON SEAM GAS COAL. Analysis of HOLMSIDE GAS COAL *in bulk as shipped* gives 10,500 cubic feet of Gas per ton, of an Illuminating Power of 16¼ candles. The Sulphur is about 1 per cent., and the Ash 1¾ per cent. The Coal cokes well, and leaves about 70 per cent. of excellent Coke. To show the progress of HOLMSIDE COALS, it may be mentioned that the quantity carbonized by the London Gas Companies in 1885 was about 200,000 tons; whereas the present consumption of HOLMSIDE COALS in London alone is at the rate of over

400,000 Tons per Annum.

Full particulars on application to
MR. MARK ARCHER,
HOLMSIDE AND SOUTH MOOR OFFICES,
NEWCASTLE-ON-TYNE.

For **FIRE-BRICKS,** the most durable for **GAS-FURNACES,**
ADDRESS
JAMES WHITE & Co., Limited,
ALBERT WORKS, WIDNES.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD
BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL

TYNE
BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	73·1 per cent.

For Prices and complete Analysis, apply to
THOS. W. DANCE & SONS,
COAL OWNERS, NEWCASTLE-ON-TYNE,
OR
E. FOSTER & CO.,
21, JOHN STREET, ADELPHI, LONDON, W.C.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on application

MEIKLEJOHN'S PATENT
Improved Slide-Valve Anti-Dip.

Is perfectly reliable in action, and requires no attention. Has all the advantages of the Dip and Anti-Dip combined.
Is cheap and easily fixed to any form of main.
Will be found the most efficient appliance of the kind yet introduced.
Further particulars and price from
C. MEIKLEJOHN,
GAS-WORKS, RUGBY.
(Late N. MEIKLEJOHN, Longwood.)

THORNLEY GAS COALS
WORKED BY THE
WEARDALE IRON AND COAL COMPANY, Ld.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

The Analysis made by Messrs. J. and H. T. PATTINSON, Public Analyst for Northumberland, gives 10,500 cubic feet of Gas per ton, with an Illuminating Power of 16·3 Candles and 67·3 per cent. of Coke. The following is a working Analysis made of these Coals by the Falmouth Gas Company:—

[COPY.]
FALMOUTH GAS COMPANY,
Offices: *Church Street, Falmouth,*
January 25th, 1893.

Messrs. the
WEARDALE IRON & COAL COMPANY, LTD.,
NEWCASTLE-ON-TYNE.

GENTLEMEN,

From the Cargo of **THORNLEY GAS COAL,** received early this month from you, I have Carbonized at these Works, during a period of thirteen consecutive days, 151$\frac{15}{20}$ tons of the Coal, mixed with 9$\frac{5}{20}$ tons of Cannel Shale (or about 6 per cent.)

The Make of Gas during the above period was 1,624,000 cubic feet.

The whole of the Gas was made from four beds of sixes (24 mouthpieces); each charge being of six hours' duration.

Gas made: 1,624,000 cubic feet.
Coal Carbonized: 151$\frac{15}{20}$ tons.
Cannel Shale: 9$\frac{5}{20}$ tons.
Make per ton of Coal and Cannel Carbonized: 10,082 cubic feet.
Coke per ton (of good quality): 13¼ cwt.

The **ILLUMINATING POWER** averages from 11 daily tests, **16·54 CANDLES,** which was ascertained by burning the Gas at the rate of 5 cubic feet per hour in a certified Letheby Photometer, fitted with a Standard Argand, each Candle consuming 120 grains of Sperm per hour.

Yours faithfully,
J. WM. BUCKLEY,
Engineer and Manager.

For Price, &c., apply to the
WEARDALE IRON & COAL Co., Ld.,
QUAYSIDE, NEWCASTLE-ON-TYNE.

PRICE **5s. 6d.,** *POST FREE.*

THE ROYAL MARRIAGE.

DEVICES FOR GAS ILLUMINATIONS,

With Instructions for the Production of Coloured Fires, &c.

By THOMAS NEWBIGGING, M.Inst.C.E.

These Devices were prepared in celebration of the Jubilee Year of the Reign of Her Most Gracious Majesty, Queen Victoria; but nearly all of them will be suitable for use in commemorating the coming National Event.

LONDON: WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

NEW BOX'S PATENT
RETORT LID-FASTENER.
CANNOT GET OUT OF ORDER.
DOES NOT DAMAGE LIDS.
SIMPLE & EFFECTIVE—CHEAP & DURABLE.
For Prices and Particulars, apply to
W. W. BOX, Gas-Works, Crayford, Kent.
[*Illustrated Description in* JOURNAL, *Vol. LX., p. 346.*]

BOLDON GAS COALS.
Worked by THE HARTON COAL CO., LTD.,
Output about 3000 tons per day.

ANALYSIS—

Yield of Gas per ton . .	10,500	Cubic Feet.
Illuminating Power . .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Commercial Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Ipswich Gaslight Company, Devonport Gas Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For prices, &c., apply to the
HARTON COAL COMPANY,
LIMITED,
Newcastle-on-Tyne.
W. H. PARKINSON,
FITTER.

CAST-IRON PIPES
FOR GAS AND WATER.
Pipes, One to Six inch Bore, kept in Stock. Also a very large assortment of all sizes of Bends, T-pieces, and Specials ready for despatch on receipt of Order.

VALVES
FOR GAS, WATER, AND STEAM.
TELEGRAMS: "PIPES GLASGOW."
WM. MACLEOD & CO.,
56, ROBERTSON STREET, GLASGOW.

T. B. KITTEL, SHEFFIELD.
CONTRACTS FOR SUPPLIES OF ANY OF THE PRINCIPAL
ENGLISH & SCOTCH CANNELS.
REAL SILKSTONE GAS COAL
ANALYSIS AND PRICES ON APPLICATION
T. B. KITTEL, SHEFFIELD.

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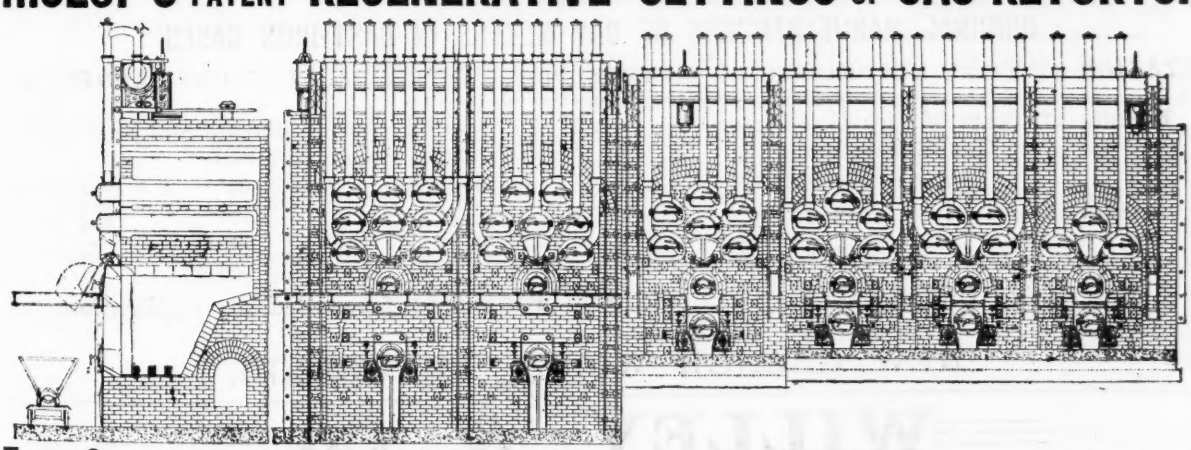

THESE SETTINGS ARE ADAPTED TO THE REQUIREMENTS OF ALL GAS COMPANIES AND GAS CORPORATIONS, AND HAVE ALREADY BEEN EXTENSIVELY ADOPTED. THEY ARE ERECTED UPON BOTH THE WORKING-STAGE AND SHALLOW-CHAMBER SYSTEMS, AND EQUALLY SATISFACTORY RESULTS ARE GUARANTEED IN BOTH CASES.

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Further particulars may be obtained on application to the Patentee's Agents: C. M. HAMILTON, 5, Stewart Street, Shawlands, Glasgow; J. E. FISHER, Stourbridge, and from R. F. HISLOP (son of Patentee), Gas-Works, Paisley.

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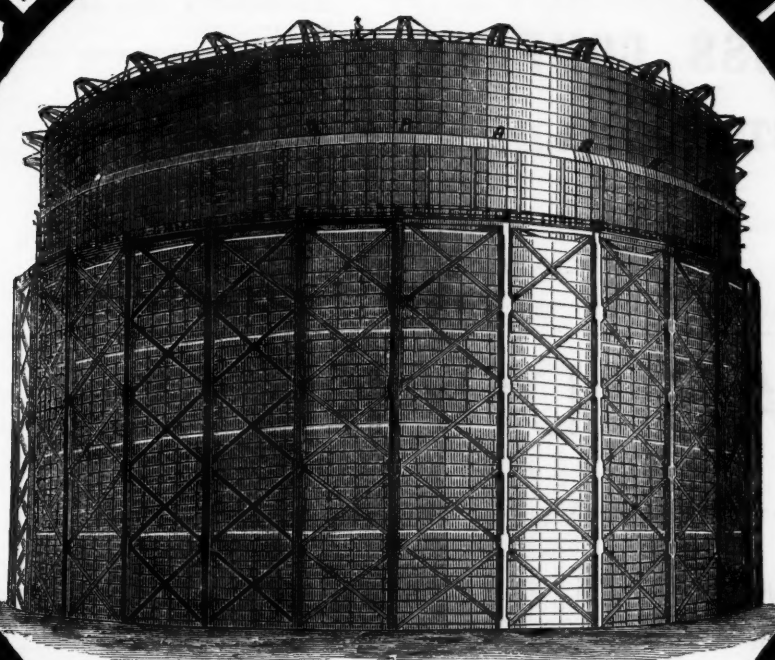

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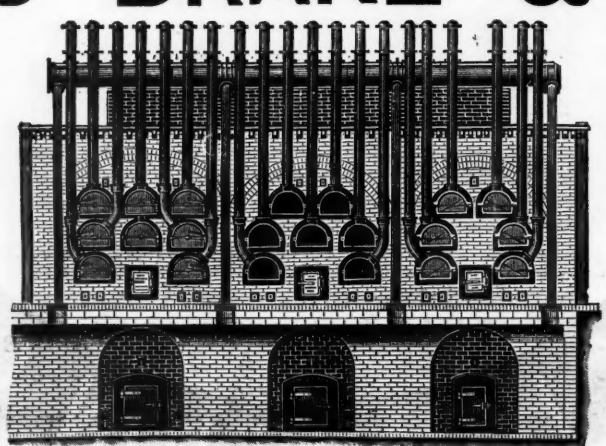

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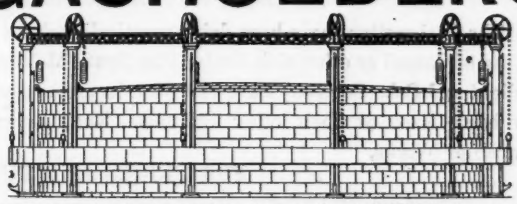

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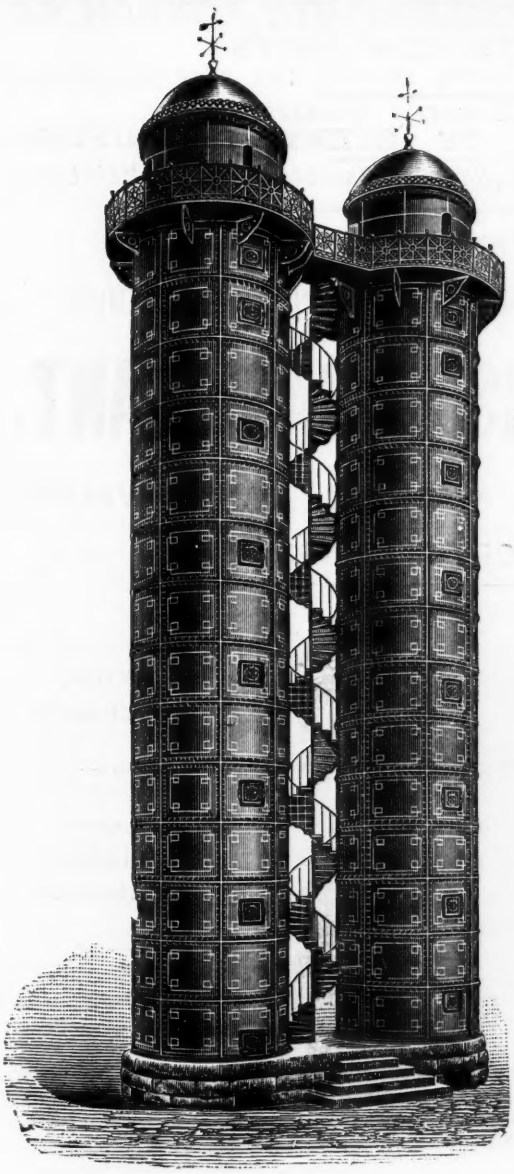

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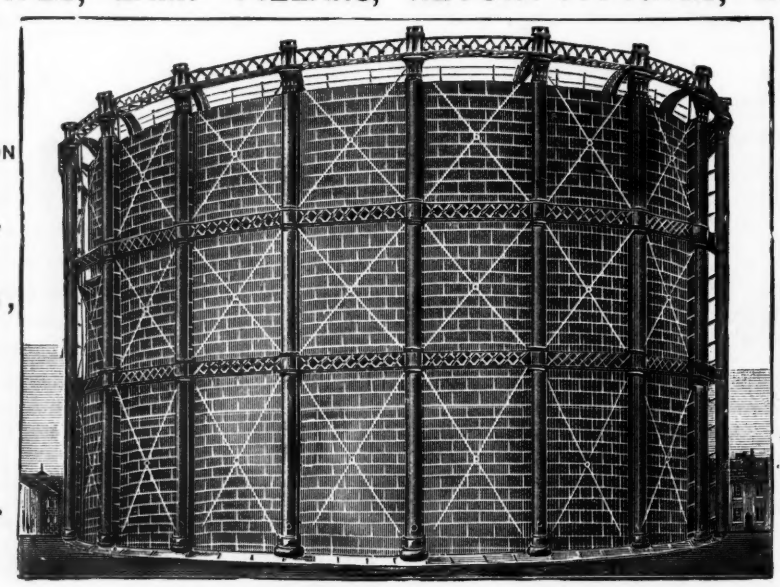

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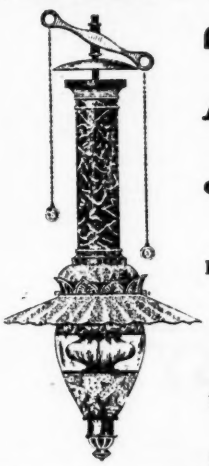

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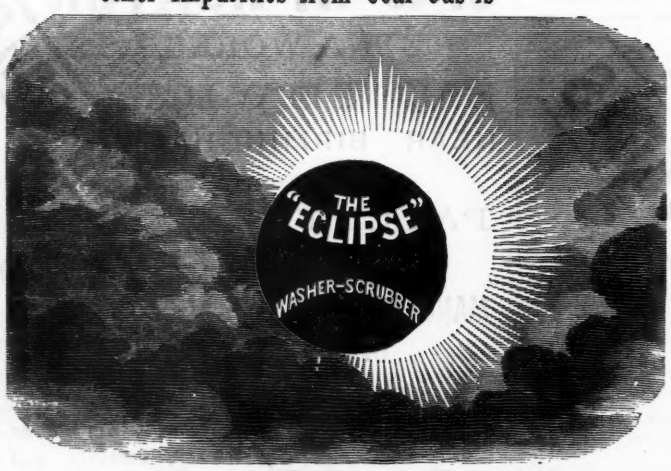
Telephone No. 223.
Telegraphic Address: "CLAPHAM BROTHERS Keighley."



Laycock and Clapham's Patent.

The Patent Wooden Balls thoroughly break up the Gas; give an immense amount of freshly-wetted Surface; and do not clog or increase back pressure.

Whilst the Gas is passing through and amongst the Balls, it is continually showered upon by the contents of Buckets.

The Shaft Revolves in Improved Bearings, and all Workings are accessible.

REPAIRS AND TROUBLE REDUCED TO A MINIMUM.

"YOU DON'T SAY SO!"

London Printed by WALTER KING (at the Office of King, Sell, and Railton, Ltd., 12, Gough Square): and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, June 6, 1893.